DOCUMENT RESUME

ED 401 445 CE 072 938

TITLE Machine Tool Advanced Skills Technology (MAST). Common Ground: Toward a Standards-Based Training System for the U.S. Machine Tool and Metal Related Industries. Volume 15: Administrative Information, of a 15-Volume Set of Skill Standards and Curriculum Training Materials for the Precision Manufacturing Industry.

INSTITUTION Texas State Technical Coll., Waco.

SPONS AGENCY Office of Vocational and Adult Education (ED), Washington, DC.

PUB DATE Sep 96

CONTRACT V199J40008

NOTE 277p.; For other volumes in this set, see CE 072 924-937.

AVAILABLE FROM World Wide Web: http://machinetool.tstc.edu

PUB TYPE Guides - Classroom Use - Teaching Guides (For Teacher) (052)

EDRS PRICE MF01/PC12 Plus Postage.

DESCRIPTORS Automation; Behavioral Objectives; Competency Based Education; Computer Assisted Design; Computer Assisted Manufacturing; Course Content; Course Descriptions; Course Objectives; Curriculum; Curriculum Development; Drafting; Job Skills; Machine Tool Operators; *Machine Tools; Manufacturing; Manufacturing Industry; *Metal Working; Postsecondary Education; Program Administration; Program Development; Program Evaluation; *Technical Education

ABSTRACT

This volume developed by the Machine Tool Advanced Skill Technology (MAST) program contains key administrative documents and provides additional sources for machine tool and precision manufacturing information and important points of contact in the industry. The document contains the following sections: a foreword; grant award letter; timeline for progress for the period October 1995 to September 1996; record of industrial assessment, including an industry-wide assessment of skills; dissemination/contacts for information and review, including a list of 47 industrial manufacturing associations and their addresses and a chart of Standard Industrial Classification and Dictionary of Occupational Titles codes that serve as an index to an industrial listing of industries, addresses, and telephone numbers; minutes of key meetings that provide insights into the skills standards development and curriculum update business; quarterly and annual reports of the program; and Internet applications and examples from the Internet that deal with MAST. A discussion of the partner occupational specialty assignments breaks out the primary and secondary responsibilities by center and specialty. Some practical evaluation models/tools are outlined and information on how to track industrial assessment efforts is provided. Evaluator reports are included. (YLB)

ED 401 445

Machine Tool
Advanced
Skills
Technology

COMMON GROUND: TOWARD A STANDARDS-BASED TRAINING SYSTEM FOR THE U.S. MACHINE TOOL AND METAL RELATED INDUSTRIES

VOLUME 15

ADMINISTRATIVE INFORMATION

of
a 15 volume set of Skills Standards
and
Curriculum Training Materials for the
PRECISION MANUFACTURING INDUSTRY

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

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U.S. Department of Education

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CACT
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San Diego City College

ITAWAMBA COMMUNITY COLLEGE
1948

Moraine Valley
Community College

SPRINGFIELD TECHNICAL
COMMUNITY COLLEGE

Texas State
Technical College
Waco

*M*achine Tool *A*dvanced *S*kills *T*echnology Program

MAST

VOLUME 15

ADMINISTRATIVE INFORMATION

Supported by
The Office of Vocational and Adult Education
U.S. Department of Education

September, 1996

GRANT INFORMATION

Project Title:	Machine Tool Advanced Skills Technology Program
Grant Number:	V199J40008
Act under which Funds Administered:	Carl D. Perkins Vocational Education Act Cooperative Demo - Manufacturing Technology, CFDA84.199J
Source of Grant:	Office of Vocational and Adult Education U.S. Department of Education Washington, DC 20202
Grantee:	Texas State Technical College Waco, Texas
Disclaimer:	This publication was prepared pursuant to a grant with the Office of Vocational and Adult Education, U.S. Department of Education. Grantees undertaking such projects under government sponsorship are encouraged to express freely their judgement in professional and technical matters. Points of view or opinions do not, therefore, necessarily represent official U.S. Department of Education position or policy.
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ACKNOWLEDGMENTS

This project was made possible by the cooperation and direct support of the following organizations:

- U.S. Department of Education, Office of Vocational & Adult Education
- MAST Consortia of Employers and Educators

MAST DEVELOPMENT CENTERS
Augusta Technical Institute - Itawamba Community College - Moraine Valley Community College - San Diego City College (CACT) - Springfield Technical Community College - Texas State Technical College

INDUSTRIES
AB Lasers - AIRCAP/MTD - ALCOA - American Saw - AMOCO Performance Products - Automatic Switch Company - Bell Helicopter - Bowen Tool - Brunner - Chrysler Corp. - Chrysler Technologies - Conveyor Plus - Darr Caterpillar - Davis Technologies - Delta International - Devon - D. J. Plastics - Eaton Leonard - EBTEC - Electro-Motive - Emergency One - Eureka - Foster Mold - GeoDiamond/Smith International - Greenfield Industries - Hunter Douglas - Industrial Laser - ITT Engineered Valve - Kaiser Aluminum - Krueger International. - Laser Fare - Laser Services - Lockheed Martin - McDonnell Douglas - Mercury Tool - NASSCO - NutraSweet - Rapistan DEMAG - Reed Tool - ROHR, International - Searle - Solar Turbine - Southwest Fabricators - Smith & Wesson - Standard Refrigeration - Super Sagless - Taylor Guitars - Tecumseh - Teledyne Ryan - Thermal Ceramics - Thomas Lighting - FMC, United Defense - United Technologies Hamilton Standard

COLLEGE AFFILIATES
Aiken Technical College - Bevil Center for Advanced Manufacturing Technology - Central Florida Community College - Chicago Manufacturing Technology Extension Center - Great Lakes Manufacturing Technology Center - Indiana Vocational Technical College - Milwaukee Area Technical College - Okaloosa-Walton Community College - Piedmont Technical College - Pueblo Community College - Salt Lake Community College - Spokane Community College - Texas State Technical Colleges at Harlington, Marshall, Sweetwater

FEDERAL LABS
Jet Propulsion Lab - Lawrence Livermore National Laboratory - L.B.J. Space Center (NASA) - Los Alamos Laboratory - Oak Ridge National Laboratory - Sandia National Laboratory - Several National Institute of Standards and Technology Centers (NIST) - Tank Automotive Research and Development Center (TARDEC) - Wright Laboratories

SECONDARY SCHOOLS
Aiken Career Center - Chicopee Comprehensive High School - Community High School (Moraine, IL) - Connally ISD - Consolidated High School - Evans High - Greenwood Vocational School - Hoover Sr. High - Killeen ISD - LaVega ISD - Lincoln Sr. High - Marlin ISD - Midway ISD - Moraine Area Career Center - Morse Sr. High - Point Lamar Sr. High - Pontotoc Ridge Area Vocational Center - Putnam Vocational High School - San Diego Sr. High - Tupelo-Lee Vocational Center - Waco ISD - Westfield Vocational High School

ASSOCIATIONS

American Vocational Association (AVA) - Center for Occupational Research and Development (CORD) - CIM in Higher Education (CIMHE) - Heart of Texas Tech-Prep - Midwest (Michigan) Manufacturing Technology Center (MMTC) - National Coalition For Advanced Manufacturing (NACFAM) - National Coalition of Advanced Technology Centers (NCATC) - National Skills Standards Pilot Programs - National Tooling and Machining Association (NTMA) - New York Manufacturing Extension Partnership (NYMEP) - Precision Metalforming Association (PMA) - Society of Manufacturing Engineers (SME) - Southeast Manufacturing Technology Center (SMTC)

MAST PROJECT EVALUATORS

Dr. James Hales, East Tennessee State University and William Ruxton, National Tooling and Machine Association (NTMA)

SPECIAL RECOGNITION

Dr. Hugh Rogers recognized the need for this project, developed the baseline concepts and methodology, and pulled together industrial and academic partners from across the nation into a solid consortium. Special thanks and singular congratulations go to Dr. Rogers for his extraordinary efforts in this endeavor.

This report is primarily based upon information provided by the above companies, schools and labs. We sincerely thank key personnel within these organizations for their commitment and dedication to this project. Including the national survey, more than 3,000 other companies and organizations participated in this project. We commend their efforts in our combined attempt to reach some common ground in precision manufacturing skills standards and curriculum development.

This material may be found on the Internet at **http://machinetool.tstc.edu**

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CATALOG OF 15 VOLUMES

VOLUME 1	EXECUTIVE SUMMARY STATEMENT OF THE PROBLEM MACHINE TOOL ADVANCED SKILLS TECHNOLOGY PROJECT PROJECT GOALS AND DELIVERABLES PROJECT METHODOLOGY PROJECT CONCLUSIONS AND RECOMMENDATIONS APPENDICES
VOLUME 2	CAREER DEVELOPMENT GENERAL EDUCATION REMEDIATION
VOLUME 3	MACHINING - CORE COURSES (MAC)
VOLUME 4	MANUFACTURING ENGINEERING TECHNOLOGY (MET)
VOLUME 5	MOLD MAKING (MLD)
VOLUME 6	WELDING (WLD)
VOLUME 7	INDUSTRIAL MAINTENANCE (IMM)
VOLUME 8	SHEET METAL (SML) AND COMPOSITES (COM)
VOLUME 9	TOOL AND DIE (TLD)
VOLUME 10	COMPUTER-AIDED DRAFTING AND DESIGN (CAD)
VOLUME 11	COMPUTER-AIDED MANUFACTURING AND ADVANCED CNC (CNC)
VOLUME 12	INSTRUMENTATION (INT)
VOLUME 13	LASER MACHINING (LSR)
VOLUME 14	AUTOMATED EQUIPMENT TECHNOLOGY (CIM)
VOLUME 15	ADMINISTRATIVE INFORMATION

VOLUME 15

ADMINISTRATIVE INFORMATION

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FOREWORD

This volume contains key administrative documents and is included in the deliverables to provide the reader additional sources for machine tool and precision manufacturing information and important points of contact in the industry. For example, this volume contains information on how to use the MAST Home Page (http://machinetool.tstc.edu). It also contains Standard Industrial Codes (SIC) listings of over 3,000 companies in the machine tool and metals related business. These listings were used in the national survey.

This volume also contains useful information for current or future grant administrators, specifically those doing industrial skills standards research. It outlines some practical evaluation models/tools and provides information on how to track industrial assessment efforts. In addition, the minutes of key meetings provide insights into the skills standards development and curriculum update business.

This volume does not contain all the administrative documentation for the MAST Program. This complete set of information is voluminous. However, this information is available on CD-ROM by contacting:

Mr. Joe Penick, MAST Program Director
Texas State Technical College
3801 Campus Drive
Waco, Texas 76705

Telephone: (817) 867-4849
FAX: (817) 867-3380
Internet: jpenick@tstc.edu

U.S. DEPARTMENT OF EDUCATION
WASHINGTON, D.C. 20202

GRANTS AND CONTRACTS
SERVICE

GRANT AWARD NOTIFICATION

1

RECIPIENT NAME

TEXAS STATE TECHNICAL COL/WACO

3801 CAMPUS DRIVE
WACO, TX 76705

2

PROJECT TITLE

MACHINE TOOL ADVANCED SKILLS TECHNOLOGY (MAST) PROGRAM

3

PROJECT STAFF

RECIPIENT PROJECT DIRECTOR

HUGH ROGERS	817-867-4834

EDUCATION PROGRAM STAFF

JACKIE FREDRICH	202-205-9071

EDUCATION GRANTS STAFF

JUANITA BOWE	202-708-8461

4

AWARD INFORMATION

PR/AWARD NUMBER	V199J40008
ACTION NUMBER	01
ACTION TYPE	NEW
AWARD TYPE	DISCRETIONARY

5

AWARD PERIODS

BUDGET PERIOD	10/01/94 - 09/30/96
PROJECT PERIOD	10/01/94 - 09/30/96

6

AUTHORIZED FUNDING

THIS ACTION	1,472,721
BUDGET PERIOD	1,472,721
PROJECT PERIOD	1,472,721
RECIPIENT COST SHARE	0%

7

ADMINISTRATIVE INFORMATION

PAYMENT METHOD	ED PMS
ENTITY NUMBER	1-741646989-A3
REGULATIONS	EDGAR, AS APPLICABLE 34 CFR 426
ATTACHMENTS	BACS

8

LEGISLATIVE & FISCAL DATA

AUTHORITY: CARL D. PERKINS VOCATIONAL AND APPLIED TECHNOLOGY
PROGRAM TITLE: COOPERATIVE DEMO - MANUFACTURING TECHNOLOGY CFDA 84.199J

APPROPRIATION	FY	CAN	OBJECT CLASS	AMOUNT
91 3/40400	94	E001347	4115	470,537
91 4/50400	94	E001647	4115	1,002,184

9

TERMS AND CONDITIONS OF AWARD

THE FOLLOWING ITEMS ARE INCORPORATED IN THE GRANT AGREEMENT:
1) THE RECIPIENT'S APPLICATION AND COOPERATIVE AGREEMENT (BLOCK 2),
2) THE APPLICABLE EDUCATION DEPARTMENT REGULATIONS (BLOCK 7).

OTHER INFORMATION AFFECTING THIS ACTION IS PROVIDED IN THE ATTACHMENTS SHOWN IN BLOCK 7.

RECEIVED
OCT 3 1994
President's Office
TSTC WACO/MARSHALL

Catherine S. DeLuca
CATHERINE S. DELUCA
GRANTS OFFICER

9/30/94
DATE

Ver. 1

ED - GCS 007 (11/93)

PLEASE SEE OTHER SIDE FOR MORE INFORMATION

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EXPLANATION OF BLOCKS ON THE GRANT AWARD NOTIFICATION

FOR DISCRETIONARY, FORMULA, AND BLOCK GRANTS
(See Block 4 of the Notification)

1. **RECIPIENT NAME** - Legal name of the recipient, name of the primary organizational unit that will undertake the funded activity, and the complete address of the recipient. The recipient is commonly known as the "grantee."

*2. **PROJECT TITLE** - A brief description of the project that includes the Catalog of Federal Domestic Assistance (CFDA) title and/or the project title as shown on the grant application form, the date(s) of the application, and any negotiated amendments.

*3. **PROJECT STAFF** - This block contains the names and telephone numbers of the U.S. Department of Education and recipient staff who are responsible for project direction and oversight.

*__RECIPIENT PROJECT DIRECTOR__ - The recipient staff person responsible for administering the project. This person represents the recipient to the U.S. Department of Education.

*__EDUCATION PROGRAM STAFF__ - The U.S. Department of Education staff person responsible for the programmatic concerns of the Department.

*__EDUCATION GRANTS STAFF__ - The U.S. Department of Education staff person responsible for the administrative and business-management concerns of the Department.

4. **AWARD INFORMATION** - Unique items of information that identify this notification.

PR/AWARD NUMBER - A unique, identifying number assigned by the Department to each application. On funded applications, this is commonly known as the "grant number."

ACTION NUMBER - A numeral that represents the cumulative number of steps taken by the Department to date to establish or modify the award through fiscal or administrative means. Action number '01' will always be "NEW AWARD."

ACTION TYPE - The nature of this notification (e.g., NEW AWARD, CONTINUATION, REVISION, ADMINISTRATIVE).

AWARD TYPE - The particular assistance category in which funding for this award is provided, i.e., DISCRETIONARY, FORMULA, or BLOCK.

5. **AWARD PERIODS** - Project activities and funding are approved with respect to two different time periods, described below:

BUDGET PERIOD - A specific portion of time for which Federal funds are being provided from a particular fiscal year to fund a recipient's approved budget. The start and end dates of the budget period are shown.

PROJECT PERIOD - The complete length of time for approved activities, from the start date of the first budget period to the projected end date of the final budget period. A project period may contain one or more budget periods.

6. **AUTHORIZED FUNDING** - The dollar figures in this block refer to the *Federal* funds provided to a recipient during the award periods.

*__THIS ACTION__ - The amount of funds obligated (added) or de-obligated (subtracted) by this notification.

*__CARRY-OVER__ - The amount of funds, remaining from the previous budget period, that are authorized by the Grants Officer for use in the current budget period. This item does not appear on all notifications.

*__BUDGET PERIOD__ - The total amount of funds of all obligations during the stated budget period, plus any authorized carry-over.

*__PROJECT PERIOD__ - The amount of funds obligated from the start date of the first budget period to this date. This amount does *not* include carry-over.

RECIPIENT COST-SHARE - The funds, expressed as a percentage, that the recipient is required to contribute to the project, as defined by the program legislation or regulations and/or the terms and conditions of the award.

7. **ADMINISTRATIVE INFORMATION** - This information is provided to assist the recipient in completing the approved activities and managing the project in accordance with U.S. Department of Education procedures and regulations.

PAYMENT METHOD - The means by which Federal funds are transferred to a recipient's account. *Most* grants are paid through the U.S. Department of Education Payment Management System (EDPMS).

ENTITY NUMBER - A unique, identifying number that the Department assigns to each recipient for payment purposes. The number is based on the recipient's Internal Revenue Service tax identification number.

*__REGULATIONS__ - The parts of the Education Department General Administrative Regulations (EDGAR) and specific program regulations that govern the award and administration of this grant.

*__ATTACHMENTS__ - Additional sections of the Grant Award Notification that discuss payment and reporting requirements, explain Department procedures, and add special terms and conditions in addition to those established in Block 9 of the award. Any attachments provided with a notification continue in effect through the project period until modified or rescinded by the Grants Officer.

8. **LEGISLATIVE AND FISCAL DATA** - This block gives the name of the authorizing legislation for this grant, the CFDA title of the program through which funding is provided, and U.S. Department of Education fiscal information.

APPROPRIATION, FY, CAN, OBJECT CLASS - The fiscal information recorded by the U.S. Department of Education accounting system to track obligations by award.

AMOUNT - The amount of funds provided from a particular appropriation and common accounting number (CAN). Some notifications authorize more than one amount from seperate appropriations and/or CANs. The total of all amounts in this block equals the amount shown on the line, "THIS ACTION" (see 'AUTHORIZED FUNDING' above (Number 6)).

9. **TERMS AND CONDITIONS OF AWARD** - Requirements of the award that are binding on the recipient.

*__GRANTS OFFICER__ - The U.S. Department of Education official authorized to award Federal funds to the recipient, establish or change the terms and conditions of the award, and authorize modifications to the award.

FOR FORMULA AND BLOCK GRANTS ONLY:
(See also Numbers 1, 4, 5, & 8 above)

2. **PROJECT DESCRIPTION** - A brief statement that identifies the date of the application, the Catalog of Federal Domestic Assistance (CFDA) title, and any amendments.

3. **EDUCATION STAFF** - The U.S. Department of Education staff persons to be contacted for programmatic and payment questions.

6. **AUTHORIZED FUNDING**

CURRENT AWARD AMOUNT - The amount of funds that are obligated (added) or de-obligated (subtracted) by this action.

PREVIOUS CUMULATIVE AMOUNT - The total amount of funds awarded under the grant before this action.

CUMULATIVE AMOUNT - The total amount of funds awarded under the grant, this action included.

7. **STATE APPLICATION IDENTIFIER (SAI) NUMBER** - A twelve-character number assigned by a state clearinghouse to applications that require state review or that are covered by Executive Order 12372.

9. **TERMS AND CONDITIONS OF AWARD**

AUTHORIZED OFFICIAL - The U.S. Department of Education staff person authorized to award Federal funds to the recipient, to establish or change the terms and conditions of the award, and to authorize modifications to the award.

☆ U S G.P.O.:[illegible]

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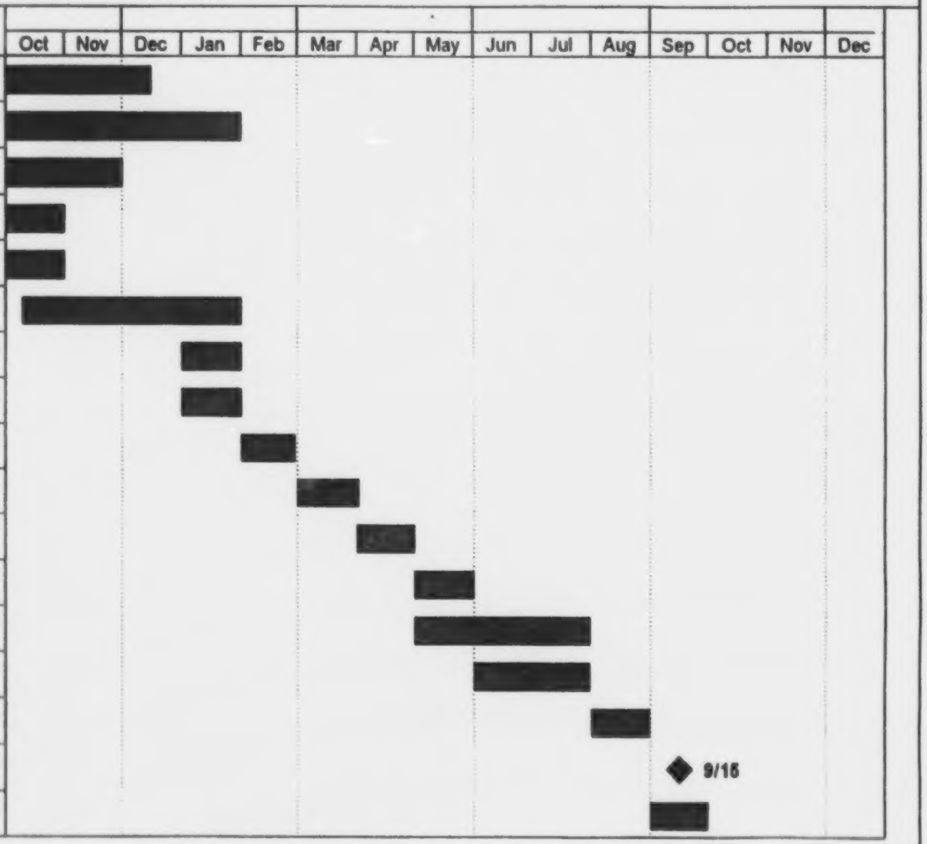
* This item differs or does not appear on formula and block grants.

MAST PROJECT GANNT CHART

October 1, 1995 - September 30, 1996

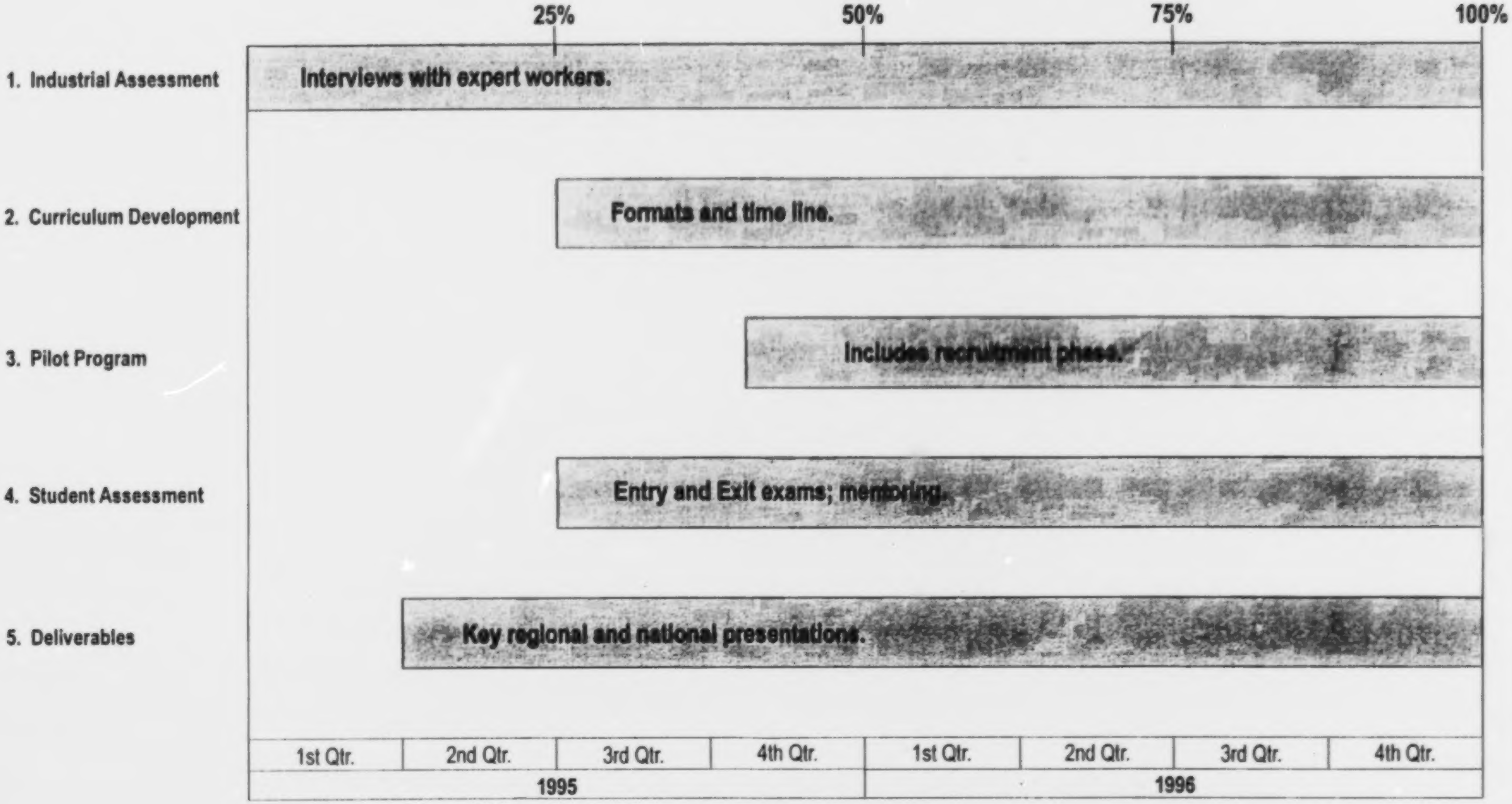
ID	Task Name	Duration	Start	Finish
1	Texas Survey	55d	10/1/95	12/15/95
2	National Survey	88d	10/1/95	1/31/96
3	Competency Profiles Finalized	44d	10/1/95	11/30/95
4	Pilot Curriculum Pretest	22d	10/1/95	10/31/95
5	Memorandum of Agreements	22d	10/1/95	10/31/95
6	Load Internet	82d	10/10/95	1/31/96
7	Draft Deliverables Book: Partners	23d	1/1/96	1/31/96
8	Executive Summary Complete	23d	1/1/96	1/31/96
9	Prepare Composite Bound Deliverables	20d	2/1/96	2/28/96
10	Joint Partner Review of Bound Deliverables	22d	3/1/96	4/1/96
11	National Partner Meeting: Review Deliverables	22d	4/1/96	4/30/96
12	Steering Committee Meeting: Review Deliverables	23d	5/1/96	5/31/96
13	Pilot Curriculum Post Test	65d	5/1/96	7/30/96
14	Prepare Final Report	42d	6/1/96	7/30/96
15	Steering Committee Review of Final Project	22d	8/1/96	8/30/96
16	Final MAST Partners' Meeting @ TSTC Waco	0d	9/15/96	9/15/96
17	Dissemination of Deliverables	21d	9/1/96	9/30/96



Project:
Date: 9/27/95

Task	▬	Summary	▬	Rolled Up Progress	▬
Progress	▬	Rolled Up Task	▬		
Milestone	◆	Rolled Up Milestone	◇		

MAST Overall Performance



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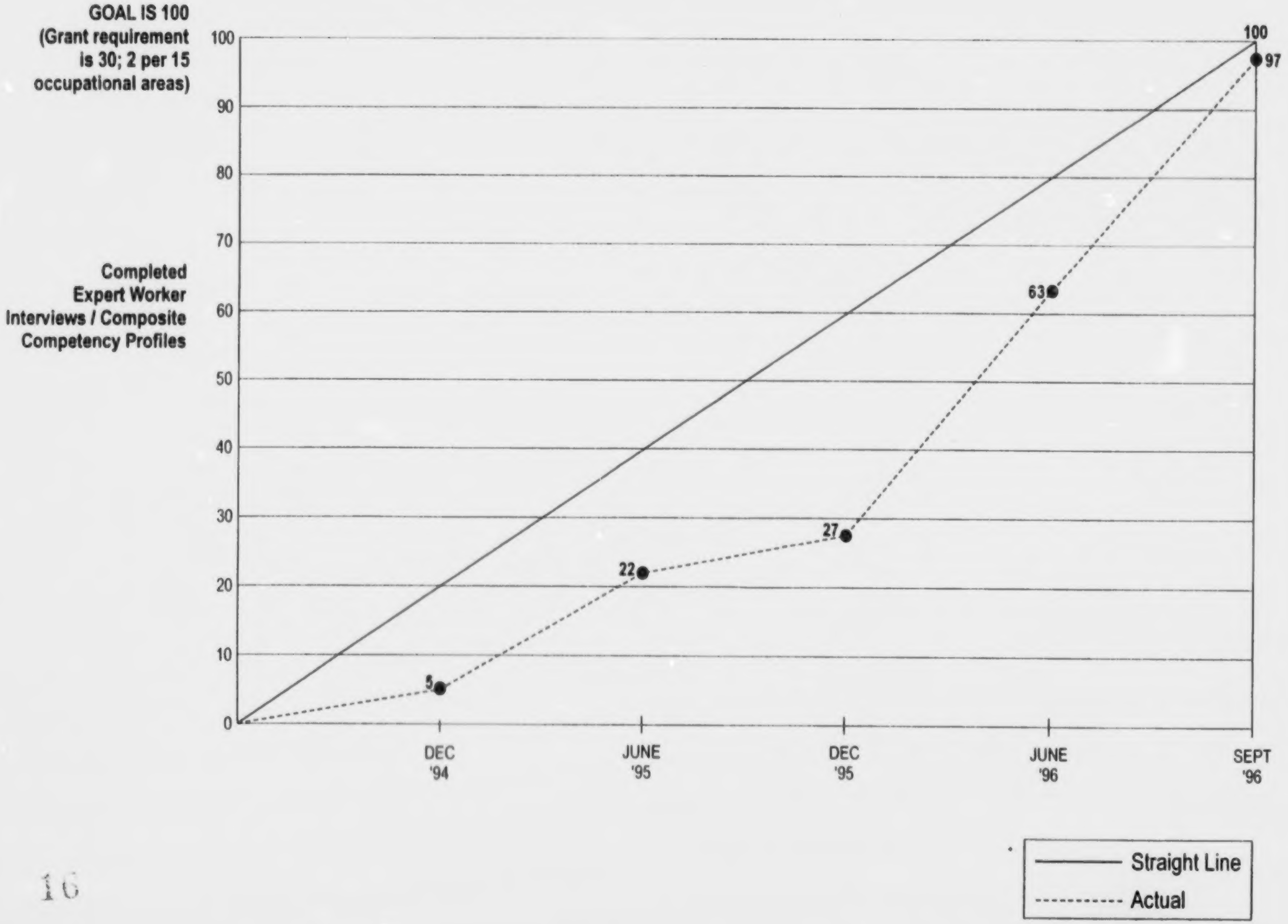
INDUSTRIAL ASSESSMENT



Machine Tool Advanced Skills
Technology Program (MAST)

Industry Wide Assessment of Skills

Lead Partner (1) Supporting Partner (2)		TSTC (1) Itawamba (2)	TSTC (1) Itawamba (2)	TSTC (1) Itawamba (2)	Moraine (1) TSTC (2)	Augusta (1) Moraine (2)	TSTC (1) San Diego (2)	TSTC (1) Itawamba (2)	Itawamba (1) TSTC (2)	Moraine (1) Itawamba (2) Augusta (2)	San Diego (1) Itawamba (2) Augusta (2) Springfield (2)	Augusta (1) San Diego (2)	Springfield (1) TSTC (2)	San Diego (1) Moraine (2)
		Manufacturing Engineering Technology (MET)	Machining (MAC): EDM; Superabrasives	Mold Making (MLD)	Welding (WLD)	Industrial Maintenance Mechanics (IMM)	Sheet Metal (SML)	Composites (COM)	Tool and Die (TLD)	Computer Aided Design and Drafting (CAD)	Computer Numeric Control / CAM (CNC)	Instrumentation (INT)	LASER Machining (LSR)	Automated Equipment Repair/CIM (CIM)
Competency Profile		02/10/95	02/05/95	04/21/95	06/15/95	03/16/95	07/05/95	07/05/95	05/17/95	06/01/95	04/28/95	02/10/95	06/13/95	06/01/95
Outline		02/04/95	01/27/95	04/20/95	06/14/95	03/15/95	06/30/95	06/30/95	05/15/95	04/01/95	04/27/95	02/04/95	06/12/95	06/01/95
Faculty Validation		X	X	X	X	X	X	X	X	X	X	X	X	X
Industrial Site Validation	1.	Bell Helicopter	ALCOA	Eureka	Brown Tool	ALCOA	Chrysler TAS	Chrysler TAS	McDonnell	Reed Tool	Brown Tool	Lockheed	EBTEC	Lockheed
	2.	Brown Tool	Bell Helicopter	D.J. Plastics	Dey Equipment	Brown Tool	McDonnell	McDonnell	Reed Tool	FMC Corporation	Chrysler TAS	NutraSweet	AB Lasers	Davis Tech.
	3.	Lockheed	Brown Tool	Foster Mold	GeoDiamond	GeoDiamond			American Saw	Thomas Lighting	Davis Tech.	Searle	Laser Fare	Eaton Leonard
	4.	McDonnell	Chrysler TAS	GeoDiamond	Emergency One	Lockheed			Smith & Wesson	ITT Engineered	Eaton Leonard	AMOCO	Laser Services	NASSCO
	5.	United Tech.	Dey Equipment		Standard Refrig.	McDonnell			Delta International	Super Sagless	GeoDiamond	ALCOA	Industrial Laser	ROHR
	6.	Devon Precision	GeoDiamond			Reed Tool			AIRCAP/MTD	Delta International	Lockheed	Emergency One		Southwest Fab.
	7.	American Saw	Lockheed			Thermal Ceramics			Super Sagless	Krueger Int'l.	McDonnell			Teledyne Ryan
	8.	Smith & Wesson	Mercury Tool			AMOCO			Thomas Lighting	Electro-Motive	NASSCO			Delta International
	9.	Emergency One	Reed Tool			ASCO			Tecumseh	Rapistan Demag	Rohr			Hunter Douglas
	10.		Chrysler Mound			Brunner				Conveyors Plus	Solar Turbine			AIRCAP/MTD
	11.		TARDEC			Emergency One					Southwest Fab.			
	12.		Sandia			FMC/United Def.					Taylor Guitars			
	13.		Emergency One			Greenfield					Teledyne Ryan			
	14.					Kaiser Aluminum								
	15.													
	16.													

INDUSTRIAL MANUFACTURING ASSOCIATIONS

The Association for Manufacturing
Technology (AMT)
Westpark Drive
McLean, VA 22102-4269

National Center for Excellence in Adult
Education
Advanced Technology Center
Sinclair Community College
4600 South Redwood
Dayton, OH 84130

National Coalition of Advanced Technology
Centers
601 Lake Air Drive
P. O. Box 21689
Waco, TX 76702-1689

National Alliance for Business
1201 New York Avenue, N.W.
Suite 700
Washington, DC 20005-3917

National Skill Standards Board
1201 New York Avenue, N.W.
Suite 706
Washington, DC 20005
1-800-787-2981

National Center of Education Economics
39 State Street, FL5
Rochester, NY 14614-1310
716-546-7620

National Council for Occupational Education
1161 Francisco Road
Columbus, OH 43220-2654

American Association of Community
Colleges
One Dupont Circle, N.W., Suite 410
Washington, DC 20036

Alliance for Community College Innovation
26522 La Alameda
Suite 370
Mission Viejo, CA 92691

CIM/HE Alliance
(Computer Integrated Manufacturing in
Higher Education)
{Individual Member Addresses}

Society of Manufacturing Engineers
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Deerborn, MI 48121
1-800-268-9591

Nelson E. Wall/Robert Reeve
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Miami, FL 33126

Victor Harville/Ronald McCage
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5201 Great American Parkway
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The following SIC and DOT codes serve as an index to assist in using the attached industrial listing.

Occupational Speciality	SIC Codes	D.O.T. Code
CNC Machinist	3599, 3549, 3545, 3540 and series 3300, 3400, 3500	609.362-010
Computer Aided Drafting Technician	3300, 3400, 3500, and 3600	007.281-010
CIM Technician	3300, 3400, 3500, 3600, and 3700	638.261-026
Computer Networking Technician	3571, 3572, 3575, 3577, 3661, 3663, 3669, and 3679	031.262-014
Systems Electrician	3300, 3400, 3500, 3620 series, 3661, 3663, 3669, 3670 series, 3694, and 3699	729.281-026
Industrial Maintenance Mechanic	series 3300, 3400, and 3500	638.281-014
Instrumentation and Control Technician	3549, all 3600, 3700 series, 3823, 3827, and 3829	003.261-010
Machinist	3540 series, 3550 series, 3599, all 3300, and 3400 series	600.280-022
Manufacturing Engineering Technician	3300, 3400, and 3500 series	012.167-042
Mold Maker	3061, and 3460 series	705.684-038
Non-Metallics Composites Technician	2899 and 3089	754.381-018
Sheetmetal/Aircraft Structural Technician	3431, 3432, 3444, 3443, 3442, 3441, 3448, and 3449	804.281-010
Superabrasives and Grinding Technician	all 3000 and 3400 series	603.280-018
Tool and Die Technician	all 300 ands 3400 series, 3545, 3541, 3542, 3543, and 3544	601.260-010
Welder	all 3300, 3400, series and 3548	819.384-010

N	AME	USE	EET				ZIP	TELEPHON	SIC1	SI	SIC3	SIC4
1	3	1728	N Main St		Guymon	OK	73942-2804	405-338-7157	3561	3	941	1781
2	3b g Co	771	Marylind Ave		Claremont	CA	91711-3531	909-621-3031	3541H			
3	7-Vs Precision Machine & Mfg	5332	Mcintosh Pt		Sanford	FL	32773-8145	407-321-1468	3599A			
4	A & A Machine Works	6801	Bienvenue St		Arabi	LA	70032-1062	504-279-9747	3599A			
5	A & A Tubular Inspection In	2211	Parker Ln		Bakersfield	CA	93308-6033	805-325-8529	1389K			
6	A & B Combustion	10816	N Highway	41	Fresno	CA	93650	209-431-3404	5074D	7699	3829	7699J
7	A & B Die Casting Co Inc	1417	4th St		Berkeley	CA	94710-1322	510-525-8991	3363	3544D		
8	A & G Tool & Die Inc		1st & H		Petaluma	CA	94955	707-762-7863	3544D	3541H	3599A	3599E
9	A & I Engineering Inc	3702	W Sample St		South Bend	IN	46619-2941	219-234-7539	3544E			
10	A & M Machine Shop	1208	4th St		Kalamazoo	MI	49001-2586	616-345-8955	3599A			
11	A & M Motor Supply	16165	Los Gatos Blvd		Los Gatos	CA	95032-4515	408-356-5141	2992	5013W	7538C	3494
12	A & M Welding	16935	S Broadway		Carson	CA	90745	310-321-5540	3542			
13	A & N Tool & Die	5615	Willow Ln		Lake Oswego	OR	97035-5338	503-635-6996	3544D			
14	A & P Grinding	1824	Railroad St		Corona	CA	91720-2512	909-736-1302	3541H			
15	A & R Grinding				Lexington	KY	40508	606-254-9928	3541H	7699P		
16	A & S Fabricating Co	265	U S Highway 431 N		Livermore	KY	42352	502-278-2371	3599A	3441	7692D	
17	A & S Machine Shop	360	Merrimack St		Lawrence	MA	01843-1740	508-794-4444	3599A			
18	A & S Pump & Machine Inc		E Columbia Ave		Boardman	OR	97818	503-481-7518	3599A	3599E		
19	A & S Tool & Manufacturing Co	4415	State St		Bettendorf	IA	52722-6172	319-355-1313	3544D	3599A	3469	3441
20	A & W Screw Machine Products I	3131	Kansas Ave		Riverside	CA	92507-3477	909-781-4901	3599A			
21	A 1 Svc Welding		12-A Climer Rd		Amarillo	TX	79121	806-359-6991	5084E	3443A	0782B	
22	A A B B C O Laboratory	6491	Southfront Rd		Livermore	CA	94550-9588	510-447-9320	3599A			
23	A A Fire Safety Equipt Corp	475	Long Beach Blvd		Long Beach	NY	11561-2233	718-347-7747	7382A	3569E		
24	A B C Machine Co	33	Londonderry Rd		Londonderry	NH	03053-6601	603-425-7417	3599A			
25	A B C Machine Works	115	Wooster St		Bethel	CT	06801-1837	203-743-0705	3599A	5084		
26	A B C Metals & Supply Co	2931	E Ventura Blvd		Oxnard	CA	93030-8846	805-485-7805	5051A	1791D	5051B	3364A
27	A B Steel Mill Inc	204	W North Bend Rd		Cincinnati	OH	45216-1728	513-761-6625	3312			
28	A H T D Inc	5055	Se Lafayette St		Portland	OR	97206-3046	503-771-6743	3544D			
29	A J C Co	8429	White Oak Ave		Rancho Cucamonga	CA	91730-3871	909-989-3675	3599A			
30	A J S Associates	27	Haverhill Rd		Amesbury	MA	01913-2227	508-388-6842	3599A			
31	A Jay Machine Co	367	Deck Valley Rd Bristol		Blountville	TN	37617	615-323-1460	3599A			
32	A P E C	7005	Corporate Cir		Indianapolis	IN	46278-1959	317-293-9200	3829	5084V	3498	3494
33	A P Technologie	897	N Redwood Rd Ogden		Salt Lake City	UT	84116-1912	801-731-5700	3089	3544E		
34	A S A P Machine Co	8575	Ronda Dr		Canton	MI	48187-2003	313-459-2447	3541C	3599A		
35	A S C Haverstick & Co	4232	Ridge Lea Rd		Amherst	NY	14226-1050	716-283-3292	3569			
36	A S C O Red Hat Valves	1334	Myrtle Ave		Akron	OH	44310	216-929-1705	3494			
37	A T & T Nassau Metals Corp	286	Richmond Valley Rd		Staten Island	NY	10309-2620	718-317-4400	3339			
38	A To Z Fabrication	6295	Harrison Dr		Las Vegas	NV	89120-4045	702-736-8886	5013	1791D		
39	A To Z Tool & Repair Inc	245	S State Road	7	Plantation	FL	33317-3734	305-581-7594	3563	5051R	3545	5072E
40	A-1 Cylinder Heads & Motors	2000	S Mckinley Ave		Oklahoma City	OK	73108-7230	405-631-7741	7538C	7538U	7538	
41	A-1 Engines & High Performance Parts	1300	N William St		Goldsboro	NC	27530-2128	919-734-2253	5531	5013	7538U	3599A
42	A-1 Machinery Inc	328	Production Ct		Louisville	KY	40299-2003	502-491-9487	3599A	3599E	3599F	7692D
43	A-1 Metal Spinning	14635	Joanbridge		Buena Park	CA	90620	818-338-8779	1791D			
44	A-1 Welding Service	180	North Ave		Athens	GA	30601-2278	706-354-0366	5063A	1791D	5039	7692D
45	A-C Control Services	501	Old County Rd		Belmont	CA	94002-2567	415-592-5125	3829			
46	A-Fn Machine Technology Inc		Schreiber Industrial Park		New Kensington	PA	15068-4531	412-335-9702	3599A			
47	Aa Fire Equipment Co				Bloomfield	CT	06002	203-726-9495	3999			
48	Aaa Ellenburg Well Pump Service	3014	Garden Lakes Blvd		Rome	GA	30165-1716	706-235-4042	5084G	3599E	1781	
49	Aaa Engineering Drlng				Weaverville	CA	96093	916-623-6289	3541C	4941	1781	
50	Aaa Paymaster Sales And Serivce	4660	Beechnut St		Houston	TX	77096-1816	713-667-7541	5044M	7389	5044D	3545
51	Abb Industrial Systems Inc	5000	Peachtree Ind Blvd Nw		Norcross	GA	30071	770-729-9119	3829			
52	Abrasive & Tool Specia	2400	Directors Row		Salt Lake City	UT	84104-4513	801-972-3182	3291	3399	3544D	2842
53	Absco	140	W Market		Somonauk	IL	60552	815-498-3843	3714			
54	Abston Machine Shop	1266	Ardmore Hwy		Taft	TN	38488-5040	615-425-6400	3599A			
55	Ac & D Industrial	5911	Clinton Hwy		Knoxville	TN	37912-2547	615-688-1556	3563	7699A	3569	
56	Academy Machinery & Engineerin	4827	Huntington Drive North		Los Angeles	CA	90031	213-225-9425	3599E			
57	Acc Rebuilders Inc	853	E Eh Crump Blvd		Memphis	TN	38126-3698	901-774-5874	3621	5013	7539	3714

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58	Accu Fabricators Inc	3750	Nicholas St		Easton	PA	18045-5116	610-253-7955	3544B	3599A		
59	Ac [illegible] ot Edm Inc	100	83rd Ave Ne		Minneapolis	MN	55432-6851	612-783-1020	3599K	356[illegible]	[illegible]99A	3544E
60	Accu [illegible] Wire Edm	2223	S Huron Dr		Santa Ana	CA	92704-4941	714-545-7154	3599K			
61	Accu-Tech Grinding Co	817	S Lakeview Ave		Placentia	CA	92670-6740	714-779-3485	3541H			
62	Accurate Ceramic Grinding	6255	Harrison Dr		Las Vegas	NV	89120-4020	702-736-1091	3541H			
63	Accurate Cutter & Tool Grindn	10280	Crouse Willison Rd		Johnstown	OH	43031-9109	614-967-5475	3541H	3599A		
64	Accurate Mach Co Inc	1058	S Ewing St		Indianapolis	IN	46203-1590	317-357-8491	3599A			
65	Accurate Machinery & Manufacturing Co	72	Roanoke Ave		Irvington	NJ	07111	201-344-8100	3599E	3542	7212	3469
66	Accurate Machining	2285	S Jason St		Denver	CO	80223-4006	303-935-4524	3541H	3599A		
67	Accurate Metal Products	2120	Lamberts Mill Rd		Westfield	NJ	07090-4783	908-654-6070	3548	3469	3451	
68	Accurate Mfg Co Inc	1940	Lone Eagle St		Alton	OH	43119	614-878-6510	3599A	7212		
69	Accurate Plastics Corp	108	W Mount Vernon St		Nixa	MO	65714-9653	417-725-2622	2671	3086	3089	
70	Ace Machine Co		Rt	111	Hampstead	NH	03841	603-329-6716	3599A			
71	Ace Machine Fabrication	9230	Princeton Rd		Hopkinsville	KY	42241	502-886-0165	3599A			
72	Ace Specialty Co Inc	695	Ensminger Rd		Tonawanda	NY	14150-6698	716-874-3670	3544D	3599K	3541H	1031
73	Acklin Stamping Div	1925	Nebraska Ave		Toledo	OH	43607-3800	419-536-4661	3399	3469	3441	
74	Acme Crankshaft Grinding Co	3534	4th St		Harvey	LA	70058-2895	504-347-8061	3541H			
75	Acme Gear Co Inc	130	W Forest Ave		Englewood	NJ	07631-4526	201-568-2245	3566	3566A	3613	
76	Acme Industries Inc	55	Bradrock Dr		Des Plaines	IL	60018-1937	708-296-3346	3599A			
77	Acme Machine		6541-D E	40	Tulsa	OK	74145	918-664-5449	3599A			
78	Acme Metal Prodts Ofc		Bridge & Beade		Plymouth	PA	18651	717-779-9533	3599A			
79	Acro Tool & Die Co		Wayne Park Dr		Cincinnati	OH	45215	513-733-5333	3544D			
80	Acro-Built Industries	126	Titus Ave		Buffalo	NY	14212-1832	716-896-6999	3599A	7692D		
81	Action Casting Of The Southeast Inc	1218	Columbus Cir		Wilmington	NC	28403-3924	910-251-3929	3363	3364	3599	
82	Action Industries	6453	Fig St		Arvada	CO	80004-1041	303-431-5794	3599A	3544D		
83	Action Machine Works Co	41	Runyons Ln		Edison	NJ	08817-2219	908-287-8888	3599A			
84	Action Threaded Products	6955	Sharlem Ave		Bedford Park	IL	60501	708-496-0100	3452			
85	Adell Machine & Repair	4749	Lancaster Dr Ne		Salem	OR	97305-1737	503-393-0953	3599A	3599F	7692D	
86	Admiral C & B Propeller & Machine Co	4930	W Commerce St		Tampa	FL	33616-2704	813-837-9476	3599A	3724		
87	Admiral Equipment Co	305	W North St		Akron	OH	44303-2398	216-253-1353	3569			
88	Adonis Art Foundry		19652-8th Street East		Sonoma	CA	95476	707-938-3757	3365	3544E		
89	Advance Development & M		Soundview Rd		Guilford	CT	06437	203-453-4325	3599A			
90	Advance Equipment Co	5404	Reichold Rd		Tuscaloosa	AL	35404-1200	205-345-9660	3599E			
91	Advance Industrial Machine		W6335 Designdr		Greenville	WI	54942	414-757-6786	3599A	3599E	3599F	
92	Advance Plastics Inc	6	Depot St		South Grafton	MA	01560-1306	508-839-0492	3089			
93	Advance Tooling	2905	Memorial Blvd		Springfield	TN	37172-4242	615-384-6716	3544D			
94	Advanced Aero Space	27956	Beale Ct		Valencia	CA	91355-1210	805-295-8282	3599A			
95	Advanced Control Incorporated	2414	3rd		East Moline	IL	61244	309-755-5545	3599D			
96	Advanced Controls & Electric C	63130	Gillette Rd		Bend	OR	97701-5707	503-388-2062	3829	1731		
97	Advanced Fabricating Technolog	2766	3 Mile Rd Nw		Grand Rapids	MI	49504-1318	616-453-4488	3999L	3053	2671	3087
98	Advanced High Technology Metal				Houston	TX	77023	713-923-6412	3364	3325	3462	3399
99	Advanced Industrial Corp	3528	31 Lic		Long Island City	NY	11100	718-472-0127	3452			
100	Advanced Prototype Speciali	18	Mammoth Rd		Pelham	NH	03076-3223	603-635-3158	3599A			
101	Advanced Rotary Cutting Systems	445	W Jackson Ave		Naperville	IL	60540-5256	708-416-6446	3999L			
102	Aero Tech Machine	1105	Garden Of The Gods Rd		Colorado Springs	CO	80907-3407	719-599-5133	3599A			
103	Aero-Dynamics	800	W Elgin St		Broken Arrow	OK	74012-2425	918-258-0290	3599A			
104	Aerodyne Machine Inc	5200	W Military Hwy		Chesapeake	VA	23321-1014	804-488-2140	7538C	5084L	7538U	
105	Aeromech Industries Inc	5468	Fairchild Rd		Crestview	FL	32536-8155	904-682-6141	3721			
106	Aerospace Technologies Inc	7445	E Lancaster Ave		Fort Worth	TX	76112-7388	817-451-0620	3724			
107	Aerospace Tool Corporation	1810	Se 1st Redmond		Redmond	OR	97756	503-923-7210	3569	3599A	3544E	
108	Agk Machine & Tool Co		N Hayes Ave		Wenonah	NJ	08090	609-468-6700	3599A	3599E		
109	Ain Plastics Inc	300	Park Ave S		New York	NY	10010-5375	212-473-2100	5945	3089		
110	Air & Hydraulics Engineerin Inc		P O Box 360108/3431 Lorna Ln		Hoover	AL	35236	205-823-7400	3511	3594A	3498	
111	Air Capital Tool Service Inc	2100	S West		Wichita	KS	67203	316-945-5854	3541H	7699D		
112	Air Movement Prods Co Inc	2	Edna St		Bedford Hills	NY	10507-1507	914-666-8979	3444			
113	Air Products And Chemicals Inc	2600	E Roosevelt Rd		Little Rock	AR	72206-2582	501-375-1256	3548B	5084I		
114	Air Sweeper Svc	348	S 40th St		Killeen	TX	76543-4646	817-690-6065	7538C	7538	7538U	3599A
115	Air-Fluid Tech Inc				Milwaukee	WI	53223	414-355-9597	3494			

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[illegible]16	Al[illegible]trol F[illegible] Co Inc	[illegible]	[illegible]son St		Batesville	MS	38606-2427	601-563-4736	3599		
117	Al[illegible]oducts Co Inc	22218	Telegraph Rd		Southfield	MI	48034-4211	810-356-4200	3451		
118	Airc[illegible]neering Inc	8702	Castle Park Dr		Indianapolis	IN	46256-1271	317-842-6292	3829	7699	
119	Airdraulics	5603	Saint Louis Ave		Odessa	TX	79762-4319	915-367-0621	3511	3599E	
120	Airtec Inc	17	W Scott Ave		Rahway	NJ	07065-4529	908-382-3700	1761	5051D	3599A	
121	Airtech Corporation				Ferndale	WA	98248	360-384-4345	7359E	5084	3569	
122	Ajusta Mfg Co	821	N River Rd		West Bend	WI	53095-2669	414-334-7611	3599A			
123	Alamo Iron Works Sales & Supply	4844	Baldwin Blvd		Corpus Christi	TX	78408-2716	512-883-9241	3369	3569	3599A	5084J
124	Alamo Pipe & Supply	406	Fairgrounds Rd		Alamogordo	NM	88310-6158	505-437-5620	5083J	3498	5211O	5091A
125	Alar Machine Inc	25	Interstate Dr		Somersworth	NH	03878-1210	603-692-7200	3599A			
126	Albuquerque Bolt & Fasteners	2926	2nd St Nw		Albuquerque	NM	87107-1416	505-345-5869	3452	5085	3493	
127	Alert Fire Fighting Equip Corp	3406	N East St		Lansing	MI	48906-2095	517-485-2061	3569E			
128	Algi Machine Shops Corp	9516	Rayo Ave		South Gate	CA	90280-5228	213-563-6013	3599A			
129	Algoma Products	8450	Algoma Ave Ne		Rockford	MI	49341-9170	616-866-3444	5531	2899	3291	7542C
130	Alineco	11246	S Post Oak Rd		Houston	TX	77035-5745	713-729-8600	3599D	3082	3829C	
131	All Industries & Dealer Supply	3390	Nw South River Dr		Miami	FL	33142-6952	305-638-9212	3452	7389G	3569	
132	Allbright Machine Co Inc	4701	N Golder		Odessa	TX	79760	915-550-9201	3599A			
133	Allegheny Steel & Brass Corp	5950	W 51st		Summit Argo	IL	60501	708-458-6687	3316			
134	Allen Industrial	960	S Hathaway St		Banning	CA	92220-6302	909-849-4966	3599E	3471		
135	Allen Machine Products	960	S Hathaway St		Banning	CA	92220-6302	909-922-9467	3599A			
136	Allen Tool & Mfg	21828	Lassen St		Chatsworth	CA	91311-3681	818-718-2258	3599A			
137	Alliance Machine Inc	10650	County Road	81	Osseo	MN	55369-4075	612-425-1616	3599A	3599F		
138	Alliance Tool & Equip	2120	Strathmore St		Fort Wayne	IN	46802-6970	219-432-2909	3599A			
139	Allied Auto Parts-Div Of Brist	20	Harper Ave		Waterbury	CT	06705-1224	203-754-5178	3714			
140	Allied Caster Company Inc	2007	S Brazos St		San Antonio	TX	78207-7741	210-222-9000	3599A			
141	Allied Distributng	3100	Pawnee St		Houston	TX	77054-3306	713-741-3100	3714			
142	Allied Precision Sales	30	E Elm Ave		Pocahontas	IA	50574	712-335-3154	3599A			
143	Allied Pump Corp	128	Harrison St		Hoboken	NJ	07030-6044	201-798-3277	5084G	3599E		
144	Allright Pipe And Boiler Insulatio Co		Nc 73 Hwy		Iron Station	NC	28080	704-735-2383	3443			
145	Allright Tool Co	6517	Georgia Rd		Birmingham	AL	35212-2725	205-591-1468	3599A			
146	Alltrista Industrial Plastics Company	600	N Weinbach Ave		Evansville	IN	47711-5909	812-479-5960	3082	3021	3089	
147	Alltype Screw Machine Prods	100	New York Ave		Westbury	NY	11590-4909	516-334-5100	3451			
148	Allwood Precision Tool Co Inc	115	Industrial		Passaic	NJ	07055	201-778-8185	3569			
149	Almac Engineering Inc	20769	Mound Rd		Warren	MI	48091-2901	810-755-2060	3469			
150	Almetco Alloys	1308	W El Segundo Blvd		Gardena	CA	90247-1524	213-321-2700	3364	5051A	1791D	5093A
151	Alp Engineering	13701	Mckinley Hwy		Mishawaka	IN	46545-7474	219-257-1000	3825			
152	Alpine Plastic	7119	Centennial Blvd		Nashville	TN	37209-1018	615-350-6300	3089			
153	Alpine Plastics Inc	6775	Mi Rd		Sterling Heights	MI	48310	810-739-7620	3089			
154	Alry Tool & Die Co Inc	386	Fillmore Ave		Tonawanda	NY	14150-2494	716-693-2419	3544D	3462		
155	Als Tool & Die Enterprises In	542	Main St		Westbury	NY	11590-4806	516-997-6153	3545			
156	Als Tool & Die Enterprises Inc	542	Main St		Westbury	NY	11590-4806	516-997-6070	2399	3499	3599A	3469
157	Altair Machinery Corp	175	Oval Dr		Central Islip	NY	11722-1402	516-582-8307	3599A			
158	Altech Metal Cutting	130	Ryerson Ave		Wayne	NJ	07470-8100	201-305-1922	3541	3599A		
159	Alumax Extrusions Inc	2300	Alumax Rd		Yankton	SD	57078-9355	605-665-6063	3354			
160	Aluminum Fabricators Inc	3416	E 23rd St		Kansas City	MO	64127-4300	816-231-8888	3365			
161	Alvin Industries	66	Saint Claire Ave		New Britain	CT	06051-1631	203-223-8967	3599A			
162	Amasteel Div Ervin Industries	3893	Research Park Dr		Ann Arbor	MI	48108-2217	313-769-4600	3291			
163	Amazon Hose & Rubber Co Rubber	130	N Jefferson St		Chicago	IL	60661-2383	312-372-4073	3494	3069		
164	Amer Hydracast Inc	1738	Harding Rd		Chicago	IL	60640	312-784-2600	3542			
165	Amer Machinery Co	2538	N Martin Lthr King Dr		Milwaukee	WI	53212	414-374-6930	3052	3545	3566	3568
166	American Acrylics & Plastics Inc		Bridgewater Area		Somerville	NJ	08877	908-685-7676	3089			
167	American Aluminum Casting Co	322	Coit St		Irvington	NJ	07111-4006	201-372-3200	5051A	3363	3369	
168	American Automation & Manufacturing Incorporat		U S Highway 23 S		East Point	KY	41216	606-789-8511	3599F			
169	American Boiler & Chimney Co	3401	Gand Ave		Pittsburgh	PA	15204	412-771-7828	3443			
170	American Bolt & Nut Co Inc	138	Carter St		Chelsea	MA	02150-1518	617-884-3331	3452	5085		
171	American Carbon & Metals	3499	Grand Ave		Pittsburgh	PA	15204	412-777-0780	3364			
172	American Cast Iron Pipe Co	3675	Crestwood Pky Nw		Duluth	GA	30136-6864	770-717-8554	3498	3494		
173	American Chocolate Mould Co In	3194	Lawson Blvd		Oceanside	NY	11572-3702	516-766-1414	3544E			

174	American Driveshaft		1904-E Stolz St		Victoria	TX	77901	512-576-6124	3714B			
175	Ar[illegible]elt & Filter	13735	Welch Rd		Dallas	TX	75244-4521	214-661-2820	5075B	35[illegible]	[illegible]11	3498
176	American Fence Inc	1112	N Lakeshore Dr		Lake Charles	LA	70601	318-436-1443	2499	331[illegible]		
177	American Linear Manufacturers	629	Main St		Westbury	NY	11590-4923	516-338-5741	3599F			
178	American Machine & Repair				Upland	CA	91784	909-988-5600	3599A	3599E		
179	American Machine Fabrication I	1224	E 8th St		New Albany	IN	47150-3347	812-944-4136	3599A	7692D		
180	American Machinist Shafting Shop	6738	6th St Sw		Cedar Rapids	IA	52404-4718	319-362-2521	3599A			
181	American Master Tool Inc	11152	Fleetwood St		Sun Valley	CA	91352-2747	818-771-0232	3599A			
182	American Mold Technologies Inc	42050	Executive Dr		Harrison Township	MI	48045-1311	810-469-0550	3544E			
183	American Plasti Plate Corp	21807	U S Hwy 69 S		Bullard	TX	75757	903-894-7281	3089			
184	American Presision Centerless		2088c E Centrl Ave		Duarte	CA	91009	818-357-6610	3541H			
185	American Refuse Systems	2608	Paper Mill Rd		Florence	SC	29502	803-662-8847	7359	5084O	4212	3469
186	American Rigging Inc	5007	S Westshore Blvd		Tampa	FL	33611-3309	813-832-3700	3315	2393		
187	American Rotary Tools Coinc Of California	12403	Slauson Ave		Whittier	CA	90606-2831	310-693-4366	3545			
188	American Shim & Die Inc	1510	Mogadore Rd		Kent	OH	44240-7531	216-678-1557	3499			
189	American Stainless Equipment	8508	San Joaquin Ave Se		Albuquerque	NM	87108-4298	505-255-7576	3494	5722	5046B	
190	American Steel Rule Die Inc	23900	Reedy Dr		Elkhart	IN	46514-9413	219-262-3437	3544D			
191	American Tire Works		395a Jericho Trnpk		Smithtown	NY	11745	516-361-6600	5531	3559M		
192	Amerifab Corporation Inc	196	Garibaldi Ave		Lodi	NJ	07644-2506	201-777-2120	3365	5722	5046B	1761
193	Ameritek Heat Treating Service	420	S	16	Houston	TX	77018	713-480-5637	3398			
194	Amex Die Cutting Service	2454	Chico Ave		South El Monte	CA	91733-1613	818-579-6800	3999L			
195	Amherst Epoxy Dist Inc		Columbia Dr		Amherst	NH	03031	603-883-3329	3089			
196	Amistad Foundry		Industrial Blvd		Del Rio	TX	78840	210-774-2015	3599			
197	Amj Equipment Corporation	1755	Olive St		Lakeland	FL	33801-4047	941-682-4500	3829			
198	Amko Service Co Hope Cryogenic Division		Hwy 4 N		Hope	AR	71801	501-777-8636	3599A			
199	Ampex Casting Inc	23	W 47th St		New York	NY	10036-2826	212-719-1318	3363	3364	3599	
200	Amsterdam Anthony Corp	1529	Boone Ave		Bronx	NY	10460-5660	718-991-1689	3599A			
201	Amtec Corporation	4808	Bradford Blvd Nw		Huntsville	AL	35805-1949	205-722-7200	9661	3599A		
202	Anchor Tool Inc	201	Jason Ct		Corona	CA	91719-6199	909-734-1749	3599E	3544D		
203	Anderson Fred & Sons Exploration Drilling	10760	Grass Valley Rd		Winnemucca	NV	89445-8706	702-623-4203	3541C			
204	Anderson J R Consultant	10036	Belding Rd Ne		Cannonsburg	MI	49317	616-691-7130	3599F			
205	Anderson Machinery Co Inc	60	Rachel Dr		Stratford	CT	06497-6411	203-375-4481	3541	5084D	3599E	
206	Anderson Tooling Co		75b Pineaire Dr		Brentwood	NY	11717	516-273-8512	3089	3544E		
207	Andon Specialties Inc	2209	N Padre Island Dr		Corpus Christi	TX	78408-2260	512-289-6366	3494			
208	Anflo Fastening Systems	1010	Beech Ave		Pittsburgh	PA	15233-2036	412-322-3311	5085	5051R	3452	5948
209	Angelus Pattern Works Inc	2084	Belgrave Ave		Huntington Park	CA	90255-2730	213-587-3674	3544E	3543		
210	Anglo Precision	1086	N Black Horse Pike		Williamstown	NJ	08094-9136	609-629-9556	3599A			
211	Ankem Chemicals Inc	2514	Cartwright St		Dallas	TX	75212-4304	214-638-4877	5169	3412	2899	3291
212	Anscott Engineering	501	W Fayette St		Syracuse	NY	13204-2925	315-475-1968	3494			
213	Apollo Broach Co	32001	Schoolcraft Rd		Livonia	MI	48150-1833	313-425-5750	3541B			
214	Apple Machine & Supply Co	5900	Orange Ave		Fort Pierce	FL	34947-1550	407-466-9353	3714B	3599A	1791D	5051D
215	Applied Control Concepts Inc	8919	N 55th St		Milwaukee	WI	53223-2313	414-362-7880	3829			
216	Approved Fire Equipment				Durham	NC	27701	919-682-8196	3999	7699		
217	Aquarian Engineering				Rocklin	CA	95677	916-652-5025	9511A	3599E	4941	7389X
218	Aquidneck Fastners		Aquidneck Dr		Tiverton	RI	02878	401-625-1172	3452			
219	Archimedes Tool & Die Machine Bg Co	14540	Charlevoix St		Detroit	MI	48215-2507	313-823-9642	3599A			
220	Arco Metals Inc	3546	Old York Rd		Baltimore	MD	21218-2562	410-235-7977	3599A			
221	Arco Tool & Cam Co	650	3rd St		Newark	NJ	07107-2625	201-484-7889	3541			
222	Arctic Fire & Safety	702	30th Ave		Fairbanks	AK	99701-7506	907-452-7806	3999	3569E	8099	504[illegible]C
223	Ardway Mfg Co Inc	527	Atlantic Ave		Freeport	NY	11520-5211	516-379-4770	1791D			
224	Arizona Analytical Instruments-Tempe Plastics	329	S Rockford Dr		Tempe	AZ	85281-3053	602-966-9681	3544E	3089		
225	Arizona Valve Fitting Co	4848	S 35th St		Phoenix	AZ	85040-2852	602-268-4848	3494	3498		
226	Ark Precision Machining Inc	602	Charcot Ave		San Jose	CA	95131-2204	408-321-0260	3599A			
227	Arles Service Co Inc	9618	Santa Fe Springs Rd		Santa Fe Springs	CA	90670-2918	310-946-5907	3479	3599A	5943E	
228	Arm Tag Precision Grinding Co	5265	W Grand Ave		Chicago	IL	60639-3096	312-622-9666	3541H			
229	Armor Equipment Sales Corp	1137	57th Ave		Oakland	CA	94621-4487	510-532-0688	5551	5093A	3339B	
230	Armstrong Export Inc	8405	Nw 53rd St		Miami	FL	33166-4511	305-592-8361	5082X	7359L	3743	3599E
231	Arnold H H Co Inc	529	Liberty St		Rockland	MA	02370-1239	617-878-0346	3599F	3541H	3599A	3552

232	Ar[illegible] Bolt & Screw Co	5424	Wheeler Ave		Fort Smith	AR	72901-8824	501-646-0540	0919	345[illegible]	5085G	
233	Ar[illegible]sion Grinding Co	5108	Elton St		Baldwin Park	CA	91706-1810	818-338-0274	3541H			
234	Arrowh[illegible] Machine Shop		Rural Route		Terra Alta	WV	26764	304-789-6490	7538C			
235	Artcraft Machine & Tool Corp	1115	W Gilliam Ave		Langhorne	PA	19047-2698	215-464-8878	3451			
236	Artesian Well & Pump Co	103	Oakridge Dr		North Prairie	WI	53153-9735	414-392-2552	3599E	1781		
237	Artmor Plastics Corp		Wills Mtn Rd		Cumberland	MD	21502	301-722-7440	3089			
238	Arundel Machine Tool Co Fax Line		Old Limerick Rd		Biddeford	ME	04005	207-282-3828	3599A			
239	Asap Manufacturing	135	S Main St		Thomaston	CT	06787-1714	203-283-8898	3599A			
240	Ascension Development Inc	2775	W 20th Ave		Post Falls	ID	83854-9301	208-773-7136	3724			
241	Ascent Manufacturing Co	395	Commercial St		San Jose	CA	95112-4404	408-298-7557	3599A	3471A		
242	Ashwell Label Dies Inc	7257	Bryan Dairy Rd		Clearwater	FL	34615	813-579-8138	3544D			
243	Asil Aerospace	9612	Lurline Ave		Chatsworth	CA	91311-5114	818-998-4413	3728	3599A		
244	Ason Metal Products Inc	1525	S Sunol Dr		Los Angeles	CA	90023-4031	213-266-1322	3469			
245	Assembly Engineering Inc	17985	E 14 Mile Rd		Fraser	MI	48026-2293	810-294-2760	3599A			
246	Associated T A D Inc	390	E Taggart St		East Palestine	OH	44413-2411	216-426-4144	3544	3599		
247	Associated Welding Supply Co	3002	S Main St		Pearland	TX	77581-4712	713-485-2755	5082A	7389G	3569	3548B
248	Asteroid Grinding Inc	2300	N Lister Ave		Chicago	IL	60614-2895	312-276-7526	3541H			
249	Astra Tool & Mfg Inc	25	Allen St		Bridgeport	CT	06604-5104	203-579-2639	3599A			
250	Astrotronics	515	E Juanita Ave		Mesa	AZ	85204-6542	602-926-8969	3599A			
251	Asvero Molded Craft	2318	Chico Ave		El Monte	CA	91733-1611	818-579-0263	3544E			
252	Ate Fixture Fab	116	Celtic Cir		Madison	AL	35758-1837	205-772-0700	3825B			
253	Atech Turbine Components	19	Ballard St		Worcester	MA	01607-1103	508-798-8928	3599A			
254	Aten Well Drilling	4273	N Dickerson Rd		Manton	MI	49663-9320	616-839-7120	3599E	1781		
255	Atkins Tool Co	1920	Bannard St		Riverton	NJ	08077-1901	609-829-9300	3599A			
256	Atlantic Machinery	3780	Nw 52nd St		Miami	FL	33010	305-635-6631	3541	5084D	3599E	7389G
257	Atlantic Sheet Metal Corp	799	Marietta St Nw		Atlanta	GA	30318-5750	404-892-9902	3364A	5085	1761D	1791D
258	Atlas Consolidated Machine Cor	50	Peel St		Paterson	NJ	07524-1004	201-684-5803	3599A			
259	Atlas Heating & Sheet Metal Fabricators	804	Marine Dr		Bellingham	WA	98225-8420	360-671-4999	1791D			
260	Atlas Machine Inc	4802	Starcrest Dr		Monroe	NC	28110-8496	704-283-7678	3599A			
261	Atlas Mfg Co	410	E Mcclurken Ave		Sparta	IL	62286-1871	618-443-4181	3321			
262	Atlas Precision Plastics		Fair Oaks Rd		Arden	NC	28704	704-684-4282	3544E	3089		
263	Atm Machines Works	1416	S Twin City Hwy		Nederland	TX	77627-4445	409-722-4484	3599A			
264	Atwood Tool And Machine Inc	39	Kattelville Rd		Binghamton	NY	13901-5802	607-648-6543	3544B	3599A		
265	Austin Air & Hydraulic	2001	E Martin Luther King Jr Blvd		Austin	TX	78702-1339	512-469-0267	3563	7699A	3511	3599E
266	Austin Electric Motor Repair	679	Aiken St		Owosso	MI	48867-3972	517-725-7017	5063C	3599E		
267	Austin Ignition Co	56	N Union St		Akron	OH	44304-1347	216-253-7791	3536	3494	5013B	5531B
268	Austin-Mac Inc	2739	6th Ave S		Seattle	WA	98134-2101	206-624-7066	3535	3599A	1791D	3568
269	Automated Control Systems Inc	932	Washington St		Norwood	MA	02062-3412	617-255-0140	3829			
270	Automatic Controls Co	19115	W 8 Mile Rd		Detroit	MI	48219-1494	313-533-8890	3829			
271	Automation Components Inc	25	Kenwood Cir		Franklin	MA	02038-3201	508-520-0001	3829			
272	Automation Design & Machine Co				Casco	ME	04015	207-627-7149	3599A	3541		
273	Automation Electric	1626	Minnesota Ave		Duluth	MN	55802-2432	218-722-1905	3829	1731		
274	Automation Products Inc	3030	Maxroy St		Houston	TX	77008-6219	713-869-0361	3829			
275	Automax Corporation	8273	S 86th Ct		Justice	IL	60458-1767	708-458-9489	3494			
276	Automotive Engineering Inc	6312	Aaron Ln		Clinton	MD	20735-2201	301-868-3555	7538C	7538		
277	Automotive Engineering Machine Shop	131	River St		Hudson Falls	NY	12839-1337	518-798-0272	7538C			
278	Automotive Industrial Engine Service Inc	1901	Barbara Ave		Gallup	NM	87301-6703	505-863-6622	7538C	7538Z	5084L	3599A
279	Awsco Inc/Stone Rebabbitting	4301	Pete Brown Rd		Charlotte	NC	28269-1627	704-596-3695	3339	3564	3599A	3599E
280	Axis C N C Machining	10760	Weaver Ave		South El Monte	CA	91733-2749	818-350-4012	3599A			
281	Aztec Well Servicing Co Radio		S Of Aztec		Aztec	NM	87410	505-334-6191	3541C	1629L	1381	1389
282	B & A Ford Performance		Nw Of City		Muldrow	OK	74948	918-427-7757	3711			
283	B & B Industries Inc	1880	55th St		Boulder	CO	80301-2742	303-444-3313	3599A			
284	B & B Machine & Tooling Inc	1011	W 2nd St N		Wichita	KS	67203-6010	316-262-1072	3599A			
285	B & C Corp Prop Shaft	123	9th St Nw		Akron	OH	44314	216-848-0850	3599A			
286	B & C Fabricating	1605	N 10th St		Noblesville	IN	46060-1510	317-773-0257	3444			
287	B & C Machine Shop	2117	W Winchester Ave		Middlesboro	KY	40965-2562	606-248-5259	3599A	3599E	7692D	
288	B & D Machine Shop	1703	Somerset Ave		Dighton	MA	02715-1243	508-669-4389	3599A			
289	B & E Machine Shop	1941	S Bluff Blvd		Clinton	IA	52732-6668	319-242-2192	3599A	3541		

290	B & [illegible]hine Shop	4420	Mclean Rd		Fort Worth	TX	76117-1819	817-656-8968	3599A			
291	B [illegible] o	6740	Lovers Ln		Kalamazoo	MI	49002-3600	616-327-9308	3452	50[illegible]		
292	B & L Machine Co	814	Cass St		Niles	MI	49120-2513	616-683-2011	3599A			
293	B & M Machine Shop Inc	37752	Po Box		Arthur	TN	37707	615-869-4712	7538C			
294	B & M Precision Inc Office	1225	4th St Sw		Ruskin	FL	33570-5348	813-645-1188	3599A			
295	B & M Precision Mfg				San Jose	CA	95100	408-727-5833	3599A			
296	B & R Fabrication & Machine	213	S Jefferson St		Allentown	PA	18102-4603	610-820-0410	3599A	7692D		
297	B & R Tool Instrument Corp	12	Comrcl Blvd		Coram	NY	11727	516-736-2275	3599A			
298	B & S Centerless Grinding C	87	Opal St		Milford	CT	06460-3029	203-874-3296	3599A			
299	B & S Engineerg Co Inc	25	Hayward St		Quincy	MA	02171-2415	617-471-2007	3599A			
300	B C D Metal Products Inc	18	Williams St		Everett	MA	02149-1910	617-389-0342	3599A			
301	B C R Tool Co	5975	Ford Ct		Brighton	MI	48116-8511	810-229-2580	3599A	7699D		
302	B D Gage Company	2013	W 7th St		Odessa	TX	79763-3713	915-337-6771	3599A			
303	B J Machine Company Inc		N4995 Hwy Q		Mauston	WI	53948	608-847-4288	3599A	3544D	5511B	7692D
304	B K & C Plastic Products	11455	M-27		Cheboygan	MI	49721	616-627-9328	3089			
305	B L & P Service	14826	Garrett Rd		Houston	TX	77044-5844	713-456-7867	3621	3599E		
306	B M Macchine Service	1617	E 49th St		Odessa	TX	79762-4402	915-362-2267	3599D			
307	B Machine Products		Rt 95 W		Parkersburg	WV	26102	304-863-3041	3599A	5063A	3541	3469
308	B-E Electronics Co Inc	2184	Flintstone Dr		Tucker	GA	30084-5008	770-939-0409	3829			
309	Babb Tool & Machine	15957	Illinois Ave		Paramount	CA	90723-4901	213-636-1916	3599A			
310	Bach Machine Co	438	Lanza Ave		Garfield	NJ	07026-2004	201-478-3062	3599A			
311	Badger Topper Machine Co	5081	N 124th St		Brookfield	WI	53005	414-781-8908	3544D			
312	Baechler Willy Machine		Hwy	49	San Andreas	CA	95250	209-754-4646	7538C	3599A		
313	Bailey Controls Co	6766	S Revere Pky		Englewood	CO	80112-3907	303-799-0200	3829			
314	Bailey Division Of Cmb	5927	South Loop E		Houston	TX	77033-1017	713-643-3107	3494			
315	Bailey Food Machs	867	Valley St		Dayton	OH	45404-2065	513-223-1914	3599	5812		
316	Ball & Socket Mfg Co	493	W Main St		Cheshire	CT	06410-2450	203-250-6000	3469			
317	Ballard Sheet Metal Works I	4763	Ballard Ave Nw		Seattle	WA	98107-4810	206-784-0545	3365	1761	3441	5084R
318	Balteau Standard Transformer Co		9130-J Red Branch Rd		Columbia	MD	21044	410-995-1820	3699			
319	Baltimore Fire Protection & Equipment Co Inc	7512	Connelley Dr		Hanover	MD	21076-1707	301-565-0569	7382A	3569E		
320	Banjo Distributing Co	7112	Oaklawn Dr		San Antonio	TX	78229-3021	210-525-1015	3699D	3691		
321	Banks Machine & Mfg Co Inc		Highway	7	Wayland	KY	41666	606-358-9678	3599A			
322	Banner Engineering Co	39	Banks Ave		Asheville	NC	28801-4017	704-252-3886	3544B	3599A		
323	Banner Tool & Die Inc	3160	Forest View Rd		Rockford	IL	61109-1686	815-398-1400	3544			
324	Banner Tool & Machine Co	1147	Industrial Blvd		Louisville	KY	40219-1803	502-964-1912	3535	3599A	1791D	3469
325	Bapko Metal Fabricators	1090	N Parker St		Orange	CA	92667-5520	714-639-2433	1791D			
326	Barajas Machine Shop	13040	Tom White Way		Norwalk	CA	90650-4547	310-926-6856	3599A			
327	Barber-Colman Company Industrial Instrument	2200	Norcross Pky		Norcross	GA	30071-3670	770-840-9811	3829	3823		
328	Barnes Manufacturing Services	560	31st St		Marion	IA	52302-3724	319-377-3442	3599A	3441	3544D	
329	Barnetts Machine Shop				Pisgah Forest	NC	28768	704-884-4343	3599A			
330	Baron Drawn Steel Corp Nights Sundays & Hol	1400	Baron Steel Ave		Toledo	OH	43607-1747	419-531-4721	3312			
331	Bartlett Phil				Fremont	CA	94536	510-792-7342	3545			
332	Basilius Tool Co Plastic Injection Molds Since	7	N Westwood Ave		Toledo	OH	43607-3339	419-536-5810	3599K	3599A	3544E	3089
333	Basque Plastics Corp	28	Jytek Dr		Leominster	MA	01453-5915	508-537-5219	3089			
334	Bastian Material Handling Cor	9820	Association Ct		Indianapolis	IN	46280-1962	317-575-9992	3599A	5084E		
335	Bath Iron Works Corp	40	Commercial St		Portland	ME	04101-4728	207-761-4800	3548A			
336	Battey Machinery Co	2960	Calhoun Rd Ne		Rome	GA	30149	706-278-8556	3569			
337	Bauer Precision Machining	2798	Aiello Dr		San Jose	CA	95111-2134	408-224-2120	3599A			
338	Bay Area Laser				Sunnyvale	CA	94086	408-245-2737	3699C			
339	Bay Pneumatic Inc	440	Convention Way		Redwood City	CA	94063-1407	415-365-1444	3511	3494	5085H	3498
340	Bay Shore Systems Inc	672	E H St		Benicia	CA	94510-3573	707-745-9233	3541C	3594A	7353	
341	Bay State Controls Corp	51	Union St		Worcester	MA	01608-1100	508-799-0335	3494			
342	Bayport Manufacturing Co	27365	Mound Rd		Warren	MI	48092-2626	810-751-4040	3469			
343	Bear Plastics Inc	3912	Broadway Ave		Fort Worth	TX	76117-3543	817-831-7252	3089			
344	Beard J W Welding & Machine		Jct Hwy 9 &	52	Decorah	IA	52131	319-382-8305	3599A	7692D		
345	Bearings & Industrial Sales Inc	1183	Parkway Dr		Blackfoot	ID	83221-1652	208-785-6574	3562	3545	7694	3494
346	Beaumont Precision Machiner	258	E 5th St		Beaumont	CA	92223-2140	909-845-4466	3599A	3441		
347	Beaumont Seal Inc	405	N Beaumont		China	TX	77613	409-752-2076	3599A			

348	Be[illegible] Manufacturing	372	Martin Ave		Santa Clara	CA	95050-3115	408-988-3253	3599A			
349	Be[illegible]ufacturing Inc	401	S Chestnut St		Owosso	MI	48867-3307	517-723-5121	3089			
350	Bede Jet Corporation	18421	Edison Ave		Chesterfield	MO	63005-3632	314-537-2333	3721			
351	Bedford Machine Cliff Carey President		Highway	42	Bedford	KY	40006	502-255-7505	3599A	3451		
352	Beech Design & Machine Co	271	Parsippany Rd		Parsippany	NJ	07054-5105	201-887-0084	3599A	3544D		
353	Beier Dallas L Williamette Drilling Co	7365	Oneil Rd Ne		Salem	OR	97303-1702	503-393-1757	3541C	5082H		
354	Belcher Auto Machine Shop Inc		Main		Centreville	AL	35042	205-926-4866	7538C			
355	Belgian Screw Machine Products	600	Homer Rd		Concord	MI	49237	517-524-8825	3451			
356	Bell Welding & Machine Shop Inc	6075	N 34th St		Terre Haute	IN	47805-1594	812-466-1288	3714B	3599A	7692D	
357	Belmont Industries	97	Blanchard Rd		Cambridge	MA	02138-1093	617-547-7600	3291	5499A		
358	Ben Tek Inc	710	E Church Ave		Reed City	MI	49677-9194	616-832-3114	3599A			
359	Benco Precision Machining	403	Old County Rd		Belmont	CA	94002-2547	415-595-5743	3599A			
360	Bencor Manufacturing Co Inc		512-2nd Ave		Redwood City	CA	94063	415-369-0549	3599A			
361	Benda Industries	8	Skander Ct		Concord	CA	94523-1727	510-685-9189	3541			
362	Bennett Machining	6804	Normandy Cir		Midvale	UT	84047-1434	801-565-0750	3599A			
363	Benny Machine Co Inc	441	Dual Blvd E		Isanti	MN	55040	612-444-5508	3599A			
364	Benrox Tool Supply	27670	Groesbeck Hwy		Roseville	MI	48066-2759	810-775-8900	5072	5085	3452	3569
365	Bernard Plastic Rpoducts Inc Injection Plastic	5055	Stickney Ave		Toledo	OH	43612-3797	419-729-3914	3089			
366	Bernier Cast Metals Inc	2626	Hess Ave		Saginaw	MI	48601-7498	517-754-7571	3325			
367	Berry Bearing Co	901	1st Ave Sw		Cedar Rapids	IA	52405-4857	319-362-9940	3562	5063C	3494	3568
368	Besco Machining	776	W Front St		Covina	CA	91722-3611	818-966-0171	3599A			
369	Best Grinding Service Inc	1201	Iowa St		South Houston	TX	77587-4825	713-947-3138	3541H	3599A		
370	Best Industrial Equipment				Stanton	MO	63079	314-927-5337	3569			
371	Best Machine & Tool Co Inc	357	Richards Rd		Zanesville	OH	43701-6605	614-452-4149	3544D			
372	Best Machine & Welding Co Inc	140	S 8th Ave		Maywood	IL	60153-1386	708-343-4455	3555	3599A	3599E	7692D
373	Best Mfg	2260	American Ave		Hayward	CA	94545-1815	510-785-1090	3599A			
374	Beta Instrument South	103	Auburn Ct		Peachtree City	GA	30269-1676	770-631-1290	3829			
375	Bete Fog Nozzle Inc	9434	Old Katy Rd		Houston	TX	77055-6366	713-461-9411	3544B	3559G		
376	Bethlehem Steel Corp Main Office Information				Sparrows Point	MD	21219	410-388-3000	3731	3312		
377	Bfpe International				Beltsville	MD	20704	301-953-7068	3569E			
378	Bilco Manufacturing Co Inc	272	Lincoln Blvd		Middlesex	NJ	08846-2305	908-356-5964	3599A			
379	Bill C Thomas Company	701	Kings Row		San Jose	CA	95112-2726	408-275-1000	3545	3315		
380	Billco Manufacturing Inc Manufacturing Plant N		Madsn Ave		Zelienople	PA	16063	412-452-0411	3599A			
381	Billerica Motor Parts	308	Boston Rd		Billerica	MA	01822	508-663-6528	5013	7538C	5531	
382	Bills Precision Machining	671	Aldo Ave		Santa Clara	CA	95054-2209	408-727-4813	3599A			
383	Biloxi Machine & Metal Works	203	Howard Ave		Biloxi	MS	39530-4613	601-436-6141	3599A			
384	Bird Machine Co Sales	24050	Madison St		Torrance	CA	90505-6015	310-373-7622	3569D			
385	Bird Machine Tool Sales Inc	300	E 10th Ct		Hialeah	FL	33010	305-888-7545	3545	3541	5084D	3599E
386	Black Machine Co	228	Buckeye Blvd		Port Clinton	OH	43452-1422	419-734-5520	3599A			
387	Blair Tool & Plastic Co		Rd	1	East Freedom	PA	16637	814-695-2032	3089			
388	Blanchester Foundry Co	214	E Cherry		Blanchester	OH	45107	513-783-2091	3369	3321		
389	Blasting Specialts	1113	S Lewis Ave		Tulsa	OK	74104-3905	918-592-1757	3291	5082N		
390	Blenn-Air Inc	229	S Glasgow Ave		Inglewood	CA	90301-2105	310-641-1888	3599A			
391	Blh Process Electronic Weighing Systems				Salt Lake City	UT	84100	801-582-2021	1711E	3829	8711L	3569J
392	Blom Industries Inc	25551	Joy		Mount Clemens	MI	48046	810-468-5600	3469			
393	Bludworty Jay Inc	3103	W Navigation Blvd		Corpus Christi	TX	78402	512-887-7981	4493H	3731		
394	Blue Chip Industries		703-8th		Mikado	MI	48745	517-826-5767	3544D			
395	Blume Power Tool Repair	3316	South Blvd		Charlotte	NC	28209-1953	704-523-7811	3291	0919	7699P	3541C
396	Boa Production Inc	30	Pekola Ter		Carteret	NJ	07008-1205	908-541-4140	3544E			
397	Bobs Diemaking & Repair Service		Po Box	32	Morristown	NJ	07960	201-539-6439	3599A	3544D		
398	Bock Machine Co Inc	16300	Arrow Hwy		Irwindale	CA	91706-2056	818-960-4122	3599A			
399	Boleky L H Co Mfr Rep		Bellevue Suburban Bldg		Pittsburgh	PA	15123	412-761-8994	3829	5099C	4961	3494
400	Boltex Inc	4901	Oates Rd		Houston	TX	77013-2815	713-675-9433	3463			
401	Bona Services	835	Potts Ave		Green Bay	WI	54304-4535	414-497-0595	3599F			
402	Bond Industrial Machinery Co	499	Atlantic Ave		Brooklyn	NY	11217-1812	718-624-1500	3599E			
403	Bone Knife Company The	4009	Avenue A		Lubbock	TX	79404-2805	806-765-6812	5084L	3541H	3421	5261B
404	Bonney Forge Main Ofc		Meadow Cedar		Allentown	PA	18102	610-435-9611	3462			
405	Boonton Plastic Molding Co	30	Plane St		Boonton	NJ	07005-1720	201-334-4400	3089	5031K		

406	Bordanaro & Son Inc	800	Moorpark Ave		Oakland	CA	94603-3710	510-632-2026	3599A	3451		
407	Bc [illegible] C Fabrication	203	Granada Dr		San Luis Obispo	CA	93401-7341	805-541-5504	3354	34	761	
408	Bo. [illegible] stems Inc	5520	Council St Ne		Cedar Rapids	IA	52402-1906	319-378-1502	3541			
409	Bosco Brothers Inc	24	Prospect Ave		Norco	LA	70079-2624	504-764-6842	3569			
410	Boughtons Precast	1724	Aspen Cir		Pueblo	CO	81006-1406	719-545-3263	3443A			
411	Boulevard Fence & Iron Works	5009	Roosevelt Blvd		Philadelphia	PA	19124-2421	215-744-5060	3548A			
412	Bowe Knives	2527	State St		Bettendorf	IA	52722-5038	319-355-4777	3541H	3421	3599A	
413	Bowen Cyrus L Constr Co		Rte 2 State Rte	676	Marietta	OH	45750	614-373-6671	3541C	1623B		
414	Bowie Bolt Supply	15123	Marlboro Pike		Upper Marlboro	MD	20772-3129	301-952-0300	3452			
415	Boyer Engineering & Manufacturing	2650	Davisson		River Grove	IL	60171	708-453-0382	3451			
416	Boylan Drilling & Supply Inc		Aga Fra		Santa Fe	NM	87501	505-982-1564	5084G	3599E	4941	5082H
417	Bracalentes Manufacturing Co	20	West Creamery Rd		Quakertown	PA	18951	215-536-3077	3599A	3451		
418	Branch Manufacturing Co	702	Pine St		North Branch	MN	55056-5115	612-674-4441	3469	3544D		
419	Brandt Metal Products	6625	E Cobaugh		New Carlisle	OH	45344	513-845-8755	3599A			
420	Breshon Machining	402	E 26th St		Tacoma	WA	98421-1311	206-627-6271	3599A			
421	Brett Machining	2951	Cloverdale Ave		Concord	CA	94518-2418	510-609-7998	3599A			
422	Briggs Equipment Corp		Rt 58 E		Suffolk	VA	23432	804-539-7404	5084L	3523	5261B	5261C
423	Briggs-Weaver Inc Industrial Trucks Industrial	1700	Choctaw Dr		Baton Rouge	LA	70805-7823	504-357-8631	3569			
424	Brink Race Craft	200	Mavis St		Irving	TX	75061-7638	214-438-3204	3711			
425	Brints Welding & Repair Serv	1701	S 20th St		Tampa	FL	33605-6657	813-248-3302	3599A	7692D		
426	Broadway Splicing & Supply Inc	200	Raser Dr		Missoula	MT	59802-1628	406-721-4013	3545	2411	5085B	3524
427	Brodbeck Toole & Machine Co				Voca	TX	76887	915-239-5441	3599A			
428	Brody Chemical Inc	4825	S 6200 W		West Valley City	UT	84119	801-963-2436	2899	3291	5087E	
429	Broker Mfg Inc	7555	S 10th St		Oak Creek	WI	53154-1909	414-764-6363	3089			
430	Brooks Equipment		155d New Boston St		Woburn	MA	01801-6227	617-933-1980	3569E			
431	Broussard Furniture & Appliance	119	Espasie Milton		Youngsville	LA	70592	318-856-8774	6515	5084G	3599E	1781
432	Brown & Morrison	8101	Denmark Rd		Pineville	NC	28134	704-554-8570	3564	3829	1711	5063N
433	Brown Corporation Of Waverly Inc Metl Stmpn	611	W 2nd St		Waverly	OH	45690-9701	614-947-7763	3469			
434	Brown Leslie E Well Drillg		Rr	1	Georgetown	PA	15043-9801	412-573-9371	3541C	3561	1781	
435	Bruces Machine Shop	1970	Swarthmore Ave		Lakewood	NJ	08701-4553	908-364-3344	3714B	3599A		
436	Brutzer Metal Products Inc	3201	W St		Lima	OH	45801	419-225-8084	1761C	3469		
437	Bsk Industries Inc	2042	Clover St		Portage	IN	46368-1609	219-762-4557	3569			
438	Btg Machines & Polishing Co Inc		State Hwy No	10	Morris Plains	NJ	07950	201-540-1960	3599A			
439	Buccaneer Enterprises	3020	N Hollywood Way		Burbank	CA	91505-1026	818-845-2320	3599A			
440	Budget Engine Rebuilders	6212	S New Engind Ave		Chicago	IL	60638	312-586-3577	7538U	7538C		
441	Buelte Tool & Engineering	6877	Belford Industrial Dr		Belvidere	IL	61008-8712	815-544-6431	3599A			
442	Build A Mold	34845	Mound Rd		Sterling Heights	MI	48310-5723	810-939-2940	3544E			
443	Bull C H Co Tool & Equip Div	233	Utah Ave		South San Francisco	CA	94080-6802	916-446-5050	1711	3536	3594A	3569
444	Burd Manufacturing Co Inc	105	Industrial Dr		East Longmeadow	MA	01028-3148	413-525-3936	3599A	3451		
445	Burger Metal Products	15412	S R	62	Charlestown	IN	47111	812-256-6661	3364			
446	Burke Products Inc	1170	S Patton St		Xenia	OH	45385-5670	513-426-7353	3679B	3599A		
447	Burnham Boilers & Controls	175	S Federal Blvd		Denver	CO	80219-2012	303-922-4328	3443			
448	Burnham Cool Heat Inc Service Guaranteed	13848	S Torrence Ave		Chicago	IL	60633-2135	708-730-1700	7549F	3714C	5013W	
449	Bustos Grinding & Repair Serv				Oakland	CA	94601	510-568-5898	3599E			
450	Buy Rite Fire & Safety Equipment Company	5220	Nw 72nd Ave		Miami	FL	33166-4858	305-591-2911	3569E	3999	5084	
451	Buyken Industries Inc	1216	N 4th Ave		Kent	WA	98031	206-852-0634	3544D	1791D	3469	1761
452	Byars Machine Co Main Office		Greenville Hwy		Laurens	SC	29360	803-682-3146	3599A	3441		
453	Byron Center Machine	45	Barry St Se		Grand Rapids	MI	49548-7713	616-455-6820	3599F			
454	C & C Metal Form & Tooling Co	10654	S Garfld Ave		South Gate	CA	90280	310-861-9554	3544D			
455	C & C Power Tools	856	Mason Ave		Daytona Beach	FL	32117-4719	904-253-5815	7699P	5072E	3599	
456	C & C Supply Co Inc	8850	Windfern Rd		Houston	TX	77064-7700	713-466-0506	3498			
457	C & D Tool & Die	335	Hubbard St		Mount Clemens	MI	48043-5422	810-463-5809	3544D			
458	C & J Fasteners Inc	25136	5 Mile Rd		Redford	MI	48239-3717	313-535-8835	0919	3452	5085G	3545
459	C & L Tool & Die Inc	1702	Se Village Green Dr		Port Saint Lucie	FL	34952-3447	407-335-5655	3599A	3469	3544D	
460	C & M Custom Machining Inc		Rr	1	Glenmoore	PA	19343-9801	610-458-0897	3599A			
461	C & S Machine Inc	18975	Nichols Rd		Lake Elsinore	CA	92532-2235	909-674-2196	3542			
462	C & S Precision Inc	802	Profit Dr		Garland	TX	75040-5749	214-487-6181	3599A			
463	C & S Valve Company	1509	Johnson Ferry Rd		Marietta	GA	30062-8122	770-973-8333	3494			

464	C [illegible]e Products	15012	Arrow Hwy		Buena Park	CA	90620	818-337-2412	3599A			
465	C [illegible] Co Inc	101	J C Cooper Rd		Fountain Inn	SC	29644-9462	803-862-4598	3599A			
466	C J Niagara County Plastics Inc	8411	Telegraph Rd		Gasport	NY	14067-9246	716-772-2536	3089			
467	C J R Manufacturing Co	206	Lincoln Ave		Hatboro	PA	19040-2225	215-674-5150	3569	5084D		
468	C T Crankshaft Grinding	3501	W 123rd St		Blue Island	IL	60406	708-371-9897	7538C	7538U	7539	7538
469	Cadillac Plastic & Chemical Co	582	Eccles Av South San Francisco		San Jose	CA	95100	408-988-1314	3089			
470	Cadillac/Faulkner Plastics Inc	1919	Nw 19th St		Fort Lauderdale	FL	33311-3538	305-527-1111	3089	1761E		
471	Cal Chemical & Manufacturing	1003	Baldwin St		Detroit	MI	48214-2430	313-331-0990	3291			
472	Calder Machine Company Inc	2116	Jody Rd		Florence	SC	29501-2032	803-665-5730	3599A			
473	Calibron Instruments	220	Grove St		Waltham	MA	02154-6550	617-894-6440	5013	3829	4911	5063N
474	Calif Metal Work Co	11381	Luddington St		Sun Valley	CA	91352-3107	818-504-0786	1761C			
475	California Alloy Co	1475	Potrero Ave		South El Monte	CA	91733-3090	818-579-3230	3823			
476	California Industrial Machine	8926	Benson Ave		Montclair	CA	91763-1670	909-985-1121	3582	3599E	5046B	
477	Calumet Stamping Co	27970	Groesbeck Hwy		Roseville	MI	48066-2797	810-776-3725	3469			
478	Cameron Grinding	24939	Budde Rd		Spring	TX	77380-3008	713-367-4777	7699D	3599A		
479	Cammerzell Tool & Die Works	650	Strawberry St		Trenton	NJ	08638-3387	609-695-7415	3599A	3544D		
480	Camtel Fabrication Inc	3616	N Flora Rd		Spokane	WA	99216-1710	509-922-3299	3365	1791D	3441	7692D
481	Canton Machine Works	6700	N Canton Center Rd		Canton	MI	48187-1649	313-459-7815	7538C			
482	Capital Machine Works	675	Madison		Bennet	NE	68317	402-782-2181	3599A			
483	Capitol Manufacturing Co Pipe	6505	Rusk St		Houston	TX	77011-4519	713-928-3488	3498			
484	Caprice Engineering Co	509	Hindry Ave		Inglewood	CA	90301-2070	310-641-6403	3599A			
485	Car-Lin Services Inc	807	S Hamilton St		Dalton	GA	30719	706-278-8116	3599A			
486	Carbet Corp	1015	Golf Dr		Pontiac	MI	48341	810-334-4523	3544D			
487	Carbonic Sales & Service				Merced	CA	95341	209-383-7440	3999			
488	Carls Machine Shop	14594	Valley Blvd		Fontana	CA	92[illegible]35-6204	909-350-1187	3714B	3599A		
489	Carlson Industries Inc	7905	Highway	85	Riverdale	GA	30274-3901	770-478-8851	3536	3599E	5084E	1389J
490	Carlson Machine Company	10927	Garfield Pl		South Gate	CA	90280-7595	310-923-3248	3599A			
491	Carnegie Manufacturing Co Inc	20	Montesano Rd		Fairfield	NJ	07004-3310	201-575-3449	3544E			
492	Carnel Labs	21434	Osborne St		Canoga Park	CA	91304-1520	818-882-3977	3825B			
493	Carolina Brass & Aluminum	1835	Harrelson Rd		Pauline	SC	29374-3212	803-574-8933	3321	3369	3599A	
494	Carolina Engineering Machine Shop		Withrow Rd		Forest City	NC	28043	704-245-1607	7538C			
495	Carolina Instrumentation Co	800	S Stratford Rd		Winston Salem	NC	27103-3202	910-768-2592	3829			
496	Carteret Die-Casting C	74	Veronica Ave		Somerset	NJ	08873-3417	908-246-0070	3363			
497	Cary Machine Co		104-E Woodwinds Industrial		Cary	NC	27511	919-467-5592	3599A			
498	Cascade Precision Inc	10809	47th Ave W		Mukilteo	WA	98275-5001	206-742-0888	3599A			
499	Casco Tool & Die	11875	Stephens Rd		Warren	MI	48089-3971	810-755-5850	3544D	3599K	3082	3544E
500	Cash C D Manufacturing Co	4900	W Bloomingdale Ave		Chicago	IL	60639-4562	312-889-3370	3599A	3469		
501	Cass Tool & Manufacturing Inc	525	Morris Ave		Mundelein	IL	60060-1966	708-949-0292	3544D			
502	Cast Machined Products	3900	Magnolia St		Denver	CO	80207-1442	303-377-1052	3369			
503	Cast Metals Inc	2711	Mullins Ct Nw		Walker	MI	49504-1219	616-453-9709	3369			
504	Casting Alternatives	14600	York Rd		Sparks Glencoe	MD	21152-9306	410-472-1233	3599A			
505	Casting Unlimited		Lake St		Morris	NY	13808	607-263-5192	3369			
506	Castle Hone & Lap	671	Aldo Ave		Santa Clara	CA	95054-2209	408-727-3922	3599A	3541H		
507	Catomar Plastics Inc	49	Research Dr		Milford	CT	06460-2864	203-878-3411	3544E	3089		
508	Cavalier Machine Shop	5005	Pine Gap Rd		Spartanburg	SC	29303-1926	803-599-1973	7538C			
509	Cei Automation Inc	15250	E 33rd Pl		Aurora	CO	80011-1237	303-375-0050	5962	8711	3599F	
510	Celcom Company Inc				Apex	NC	27502	919-387-0415	3569E			
511	Center Machine Inc	221	State Rd	35	Centuria	WI	54824	715-646-2511	3599A			
512	Center Precision Products		Westover Dr		Newport	VT	05857	802-334-1480	3599A			
513	Central Caster & Material Handling Inc	10733	Colewood Ln		Dallas	TX	75243-5207	214-341-0899	3429	3569	5084E	5023P
514	Central Equipment Co Inc	855	Angliana Ave		Lexington	KY	40508-3190	606-253-2611	3523	5261C	5999	3621
515	Central States Tooling Serv Inc	241	E Helena St		Dayton	OH	45404-1003	513-223-1313	3541	3599A		
516	Ceramic & Metal Coatings Shop		Coffey Ln		Mc Donough	GA	30253	770-957-1561	3599A			
517	Ceramic Cooling Tower Co	650	N Sam Houston Pky E		Houston	TX	77060-5906	713-448-8440	3443			
518	Challenge Fastener Inc	936	Electric		Ashland	OH	44805	419-289-6295	3452			
519	Chambers Machinery Inc	3031	W Chambers St		Milwaukee	WI	53210-2043	414-442-6460	3599A			
520	Chandler Industries		Airport Indstrl Park		Montevideo	MN	56265	612-269-8893	3599A			
521	Chanute Machine	200	N Plummer Ave		Chanute	KS	66720-1424	316-431-4080	3599A			

522	Chardon Tool & Supply Inc	11993	Ravenna Rd		Chardon	OH	44024-9044	216-286-6440	3541			
523	Ch[illegible]chine Tool Inc	26416	W 7 Mile Rd		Redford	MI	48240-1917	313-533-8126	3599A			
524	Cha[illegible]stries Inc	8100	Reading Rd		Cincinnati	OH	45237-1400	513-821-3939	3089			
525	Chattanooga Supply Inc	4295	Cromwell Rd		Chattanooga	TN	37421-2166	615-899-8484	2899	5087C	7359A	3569
526	Chatten E M Equipment Co Inc	2625	N 24th St		Quincy	IL	62301-1215	217-222-5454	3523			
527	Chautauqua Machine Specialties		Parpenter-Pringle Rd		Ashville	NY	14710	716-782-3276	3599A	3544D		
528	Chellis International	819	W State St		Fremont	OH	43420-2537	419-332-0229	3291	5999F		
529	Chester Industries Inc	5061	W 161st St		Cleveland	OH	44142-1602	216-676-4900	3569			
530	Chgo Hi-Speed Tool & Supply Co	5480	N Elston Ave		Chicago	IL	60630-1454	312-736-9600	3545	3291	3569	3541
531	Chips Machine Service	2522	W Mcdowell Rd		Phoenix	AZ	85009-2907	602-233-9656	3599A			
532	Christie Mach Works Co Inc	425	W Mccarty St		Indianapolis	IN	46225-1237	317-638-8840	3599A	7692D		
533	Cincinnati Controls Inc	6580	Corporate Dr		Cincinnati	OH	45242-2101	513-530-0044	3679B	3829		
534	Cincinnati Gilbert Mach Tool Co	3366	Beekman St		Cincinnati	OH	45223-2700	513-541-4815	3541			
535	Cinti Electrl Tool Inc	5928	State Rt	28	Miamitown	OH	45041	513-353-3662	3541H			
536	Cinti Valve Co	1519	Tremont Fairmnt		Cincinnati	OH	45205	513-471-8258	3494			
537	Cinti Ventilating Co	7410	Industrial Rd		Florence	KY	41042-2916	606-371-1320	3365	3399	1761	3441
538	City Tool Die & Mfg Co Inc	984	Memorex Dr		Santa Clara	CA	95050-2810	408-727-4611	3599A	3541		
539	Clampitts Well Systems Inc				Gray	GA	31032	912-986-5312	3541C	3599E	1781	3561
540	Classic City Tool & Engrg	1929	Wayne St		Auburn	IN	46706-3514	219-925-1420	3599K	3599A	3544D	
541	Classic Die Inc	610	Plymouth Ave Ne		Grand Rapids	MI	49505-6040	616-454-3760	3544D	3544E	3541	
542	Classic Machine		E Hwy	290	Giddings	TX	78942	409-542-4167	3599A	1629L		
543	Classic Tool Mach Inc	546	Hoyt St		Painesville	OH	44077-3616	216-352-1693	3544B	3599A		
544	Clayton Industries Stamping	4115	Commerce Ave		Fairfield	AL	35064-1325	205-780-8300	3469			
545	Clegg Manufacturing Co	117	Cedar Ln		Englewood	NJ	07631-4803	201-568-0888	3599A			
546	Cleveland Tubes Inc	4201	W Orange St		Pearland	TX	77581-3326	713-485-3133	3498			
547	Cline Machine Works	1706	W Cherry		Clarksville	AR	72830	501-754-7161	3599			
548	Clovis Hednry Industries Inc	7021	La Highway 1 S		Addis	LA	70710-2032	504-749-3531	3564	1541A	3569D	6515
549	Coast Carbide Engineering	13429	Valley Blvd		La Puente	CA	91746-2418	818-961-5530	3363	3544D		
550	Coastal Bolt Sales & Serv In	3702	Colgate St		Houston	TX	77087-4604	713-644-2069	3452	5085		
551	Coastal Corrosion Control Inc	11386	S Choctaw Dr		Baton Rouge	LA	70815-2101	504-275-6131	5051	8661	2899	3541C
552	Coastal Instrument Services				Arroyo Grande	CA	93421	805-481-5558	3825			
553	Coastal Rubber & Gasket Co	3356	Sports Arena Blvd		San Diego	CA	92110-4530	619-222-1161	3053	3069	3999L	5551
554	Coastal Welding	1125	48th St		West Palm Beach	FL	33407-2388	407-863-5104	3365	8712C	3441	5084R
555	Coats Warner Corp	14731	Keswick St		Van Nuys	CA	91405-1206	818-994-4504	3569	5083G	5084H	2671
556	Coffman Welding & Metal Work	477	Cates Bypass Rd		Russellville	KY	42276-2339	502-726-8677	1761C			
557	Cohn & Gregory Inc	1805	East Ave		Fort Worth	TX	76103-2107	817-335-2693	5063C	3494	3498	3317
558	Coleman Steel Treating Inc	8465	Hamilton Rd		Memphis	TN	38101	901-342-1234	3398			
559	Collier Metal Craft	424	Commercial Blvd		Naples	FL	33942-4709	941-643-0095	3444			
560	Collins Machine & Die	1793	Homer Corn Rd Se		Marietta	GA	30007	770-426-7700	3599A			
561	Collins Machine & Tool Co	924	Myatt Industrial Dr		Madison	TN	37115-2429	615-860-2846	3544D			
562	Collins Sheet Metal		Route	4	Berwick	ME	03901	207-384-4428	3444			
563	Colonial Electric Corp	523	S Ellis Rd		Jacksonville	FL	32203	904-783-0128	3825B			
564	Colonial Mold Inc	44479	Reynolds Dr		Clinton Township	MI	48036-1245	810-469-4944	3544E			
565	Color Casting Inc	155	Canal St		New York	NY	10013-4511	212-925-9595	3363	3364	3599	
566	Columbia Machine Works	934	75th Ave		Oakland	CA	94621-2912	510-568-0808	3599A	3599E		
567	Combined Casting Corp	37	W 47th St		New York	NY	10036-2809	212-382-0832	3363	3364	3599	
568	Combustion & Control Inc	20715	50th Ave W		Lynnwood	WA	98036-7608	206-774-1163	5074D	1711E	3694	3829
569	Commerce Grinding Co Inc	600	W Commerce St		Dallas	TX	75208-1804	214-651-1977	3541H	3599A		
570	Commerce Pipe And Steel Co	11017	Gravois Industrial Ct		Sappington	MO	63128-2040	314-849-1188	3498			
571	Commercial Distributing Co Div Of Burke Engi	870	W 2600 South So Slt Lk		South Salt Lake	UT	84105	801-972-2039	3829			
572	Commercial Plastic & Supl Corp	9831	Jamaica Ave		Jamaica	NY	11421-2213	718-849-8100	3021	3089		
573	Commercial Plastics	9834	Jamaica Ave		Jamaica	NY	11421-2255	718-441-1500	3089			
574	Commercial Screw Products Inc	30520	Lakeland Blvd		Wickliffe	OH	44092-1750	216-944-8200	3599A			
575	Commercial/Stack Heat Treaters Inc Commerc	2447	6th Ave S		Seattle	WA	98134-2024	206-623-5042	3398			
576	Companion Industries Inc	891	W Queen St		Southington	CT	06489-1094	203-628-0504	3544D			
577	Comptronics Inc	39	Calvary St		Waltham	MA	02154-5974	617-891-4120	3599A			
578	Computer Automated Technologies	118	E Touhy Ct		Des Plaines	IL	60016	708-296-2111	3599A			
579	Concepts Machine Tool Engineering	317	E Gd Riv		Fowlerville	MI	48836	517-223-7235	3541	3599F		

580	Co[illegible]n Machine Works Inc	1220	Texas Ave		El Paso	TX	79901-1613	915-533-0411	3599A	331[illegible]	7692D	
581	Co[illegible] Aircraft Products Inc	246	Shaker Rd		Enfield	CT	06082-2366	203-763-3986	3599A			
582	Consolidated Controls	5701	Safety Dr Ne		Comstock Park	MI	49321	616-784-0050	3829			
583	Consolidated Hardware & Indust	3256	N Pulaski Rd		Chicago	IL	60641-4793	312-685-2100	3569			
584	Consolidated Metal Products Inc	3445	Garber Dr		Tallahassee	FL	32303-1115	904-576-2167	3354	1761D	5271A	5211H
585	Conspec Systems Inc	55	Winans Ave		Cranford	NJ	07016-3144	908-272-2771	3354	3399		
586	Contemporary Casting Ltd	260	W 52nd St		New York	NY	10019-5829	212-333-5958	3363	3364	3599	
587	Contico International	24	Zane Grey St		El Paso	TX	79906-5226	915-772-5000	3089			
588	Continental Machine & Eng	4949	Huish Dr		East Chicago	IN	46312-3768	219-398-7300	3599A			
589	Continental Metal Specialty Inc	100	Continental Dr		Richmond	KY	40475-9698	606-623-7411	3544D			
590	Contract Design Services Inc	1133	Mount Read Blvd		Rochester	NY	14606-2815	716-254-0050	2399	3599F		
591	Control Components Inc	2275	Lower Wetumpka Rd		Atlanta	GA	30303	404-688-2316	3829			
592	Control Engineering Inc	190	Doty Cir		West Springfield	MA	01089-1310	413-781-1330	3829	5065		
593	Control Industries	2129	Center Park Dr		Charlotte	NC	28217-2904	704-357-3113	3829			
594	Control Technologies Inc	89	Ethan Allen Dr		South Burlington	VT	05403-5857	802-860-1700	3829			
595	Controlled Precision Machining Inc	37560	Enterprise Ct		Farmington Hills	MI	48331-3467	810-553-4411	3599A			
596	Converting Technology Inc		Hackettstown Area		Hackettstown	NJ	07840	908-850-3767	3569			
597	Conveyor Equipment Company	2350	Sherry Dr		Yorktown Heights	NY	10598-3657	914-962-6264	3444			
598	Cooper Industries	409	S River Rd		Naperville	IL	60540-5036	708-717-7839	3494			
599	Cooper Metals Inc	5302	Spencer Hwy		Pasadena	TX	77505-1514	713-487-9585	1761	1791D		
600	Corey Canapary & Galanis Rsch	447	Sutter St		San Francisco	CA	94108-4601	415-397-1200	8741G	3829C		
601	Cornett Machine Shop Inc	706	S Highway	27	Somerset	KY	42501-3509	606-678-5163	7538C			
602	Cornucopia Tool & Plastics Inc	448	Sherwood Rd		Paso Robles	CA	93446-3554	805-238-7660	3089			
603	Corporate Cutting Dies Inc	540	Dana Ave		Columbus	OH	43223-5201	614-464-2361	3999L	3544D		
604	Corrosion Materials	4650	S Pinemont Dr		Houston	TX	77041-9311	713-939-0364	3364	3446		
605	Costa Mach Inc	924	Home Ave		Akron	OH	44310-4187	216-376-3636	3599A	3599F		
606	Cottage Casting Co		John		Morristown	NJ	07960	201-539-4780	3369			
607	Count-On Tools Inc Fax	366	Carl Cedar Hill Rd		Winder	GA	30680-3443	404-307-1785	3545			
608	Countrs Precision Grinding Co	66	E 10 Mile Rd		Hazel Park	MI	48030-1135	810-541-0016	3541H			
609	County Line Equipment Co In	8507	Pacific Hwy E		Tacoma	WA	98422-3917	206-922-6658	3599E	5082		
610	Covlet Machine & Design Inc	14628	Smokey Point Blvd Ste	4	Marysville	WA	98271-8900	360-658-1977	3599A	1791D		
611	Cox Machine Inc	5920	W	21	Wichita	KS	67203	316-943-1342	3599A			
612	Cq Machining	21427	N 23rd Ave		Phoenix	AZ	85027-2525	602-516-1556	3599A			
613	Cragin Hardware & Industria	2021	N Laramie Ave		Chicago	IL	60639-3193	312-237-4170	5722F	5251	3569	5231A
614	Craig & Neier Service Mch Shop	232	E Main St		Plainfield	IN	46168-1115	317-839-6251	7538C			
615	Craig H M Metals & Supply Co	280	Rocky Creek Rd		Greenville	SC	29615-6145	803-234-5724	3498	5051D	3494	
616	Crains Grinding & Machine Ser	4473	N Highway	16	Denver	NC	28037-8186	704-483-0551	3599A	7699P		
617	Cramers Grinding & Tooling	3447	Baldy View Ln		Springfield	OR	97477-9401	503-747-6704	3544D	3599A		
618	Crane Valley Casting Inc		Crane Creek Rd		Crane	MO	65633	417-723-5539	3363			
619	Crankshaft Grind & Metal	1124	S 300 W		Salt Lake City	UT	84101-3053	801-364-6427	7538C	7538Z	7538U	3599A
620	Croft & Son Mfg Inc	509	Highland Ave		Tiltonsville	OH	43963-1110	614-859-2200	3599A	7692D		
621	Crosby Mfg Co		Crosby		Crosby	MN	56441	218-546-5115	3089			
622	Cross/Laubenstein Manufacturing Co	166	Dundaff St		Carbondale	PA	18407-1565	717-282-4344	3089			
623	Crowl Machine & Heat Treati	1632	Nw 5th St		Oklahoma City	OK	73106-5046	405-236-4702	3541H	3599A	7699D	
624	Crutchfield Stamping Inc	8596	Lake Chetac Dr		Cincinnati	OH	45241-3402	513-398-2046	3469			
625	Crystal Industries	1835	Ne 144th St		Miami	FL	33181-1419	305-944-5671	3291			
626	Crystal Metal Products Co Inc	2700	Castor Ave		Philadelphia	PA	19134-5598	215-426-5322	3599A			
627	Cuno Machine Co		Star Rt		Montgomery City	MO	63361	314-564-2788	3599A	7692D		
628	Curtis Steel Corporation	6504	Hurst St		Houston	TX	77008-6217	713-861-4621	3542	5051D	2299	
629	Custom Automatic Mach	320	Vermont Ave		Dayton	OH	45404-1524	513-224-1391	3599A	3451		
630	Custom Coating Division	4127	Meadow Ln		Bossier City	LA	71111-2911	318-742-0300	3398			
631	Custom Contracting Services Inc	3358	Burd Rd		Casper	WY	82601	307-265-6251	1541	3541C	1794	7699H
632	Custom Controls Corporation	4630	16th St E		Fife	WA	98424-2663	206-922-5874	3829	1731		
633	Custom Cylinder Hd	1210	S May		Oklahoma City	OK	73100	405-681-2242	7538C			
634	Custom Engine Machine Service	2714	9th St		Bremerton	WA	98312-3859	360-479-2560	7538C	3599A		
635	Custom Grinding	22952	Rasch Dr		Mount Clemens	MI	48043	810-792-6970	3541H	3599A		
636	Custom Head Porting	956	N Us Highway	17/92	Longwood	FL	32750-3156	407-834-3078	7538C			
637	Custom Hydraulic & Machine Inc	22911	86th Ave S Kent		Kent	WA	98031-2466	206-854-4666	3599A			

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638	Custom Machine & Tool	3701	S Interstate 85 Service Rd		Charlotte	NC	28206-3543	704-391-9325	3599A	7699P	7699D	
639	Cu[illegible]chining	127	N Cherry St		Flushing	MI	48433-1601	810-659-2454	3599A			
640	Cus[illegible]etalcraft Inc		E Hwy		Mountain View	MO	65548	417-934-6075	1791D			
641	Custom Mold & Tool	150	East Dr		Melbourne	FL	32904-1025	407-724-0127	3599A	3544E	3089	
642	Custom Rollforming Corp		1-E		Moundridge	KS	67107	316-345-2821	3542			
643	Custom Stainless Steel Inc	1853	Buerkle Rd		White Bear Lake	MN	55110-5246	612-777-4948	3325			
644	Custom Tool & Design Inc	4962	Pittsburgh Ave		Erie	PA	16509-6207	814-838-9777	3599A	3544E	3544D	
645	Custom Tool & Die Co	2355	W Marquette Wds		Stevensville	MI	49127	616-429-8791	3544D			
646	Cytemp Specialty Steel Div	17409	Marquardt Ave		Cerritos	CA	90701	310-926-6629	3312			
647	D & B Machine Shop	2504	Po Box		Pocatello	ID	83206	208-234-0516	7538C			
648	D & D Industries Inc	33787	Groesbeck Hwy		Fraser	MI	48026-4207	810-294-5580	3599A			
649	D & D Machine Shop	1880	Aspen Cir		Pueblo	CO	81006-1408	719-546-1880	3599A	3441	7692D	
650	D & D Welding	1280	Ocean St		Eugene	OR	97402-2916	503-343-2553	3365	3523E	1711P	7692D
651	D & F Corporation	42455	Merrill Rd		Sterling Heights	MI	48314-3239	810-254-5300	3544E			
652	D & J Machine Shop	4120	Industrial Ln		Beaver Creek	OH	45430-1004	513-427-0827	3599A	3599K		
653	D & N Iron Works	1801	N Lexington Blvd		Corpus Christi	TX	78409-1325	512-289-9004	3599A	3599E	7692D	
654	D & S Machine & Welding	11105	Benston Dr E		Puyallup	WA	98372-2840	206-848-4611	3599A	3441	7692D	
655	D & V Sons Inc	19	Lines Hill St		Naugatuck	CT	06770-3014	203-729-5372	5032C	3541C		
656	D C Industries	2334	N Austin Ave		Georgetown	TX	78626-4515	512-869-4841	3599A	3451		
657	D C L Tooling Mach Shop	13987	Pioneer Rd		Apple Valley	CA	92307-4359	619-240-1048	3599A			
658	D K Machine Inc	10	Sullivan Pky		Fort Edward	NY	12828-1027	518-747-0626	3599A			
659	D L J Sealing Dies	6032	S Railroad		Lyons	WI	53148	414-763-3484	3544D			
660	D L R Machine Shop Inc				Lockridge	IA	52635	319-696-3600	3599A			
661	D M B Tool Co	12	Church Ave		Clawson	MI	48017-2006	810-585-3366	3569			
662	D T Mechanicals		Corner Of U S Hwy 31 & Al Hwy	97s	Montgomery	AL	36108	334-284-5693	3523			
663	D Vn Tool & Die Services	1617	Covell Ave Nw		Grand Rapids	MI	49504-2676	616-453-1112	3599A	7699D		
664	D W Machine	242	W Monroe St		Jackson	MI	49202-2252	517-787-9929	3599A			
665	Dabney Machine Shop	125	S Estill Ave		Richmond	KY	40475-2013	606-623-5105	7538C			
666	Dakota Tool & Machine	829	E Villard St		Dickinson	ND	58601-5379	701-225-5221	3599A	7692D		
667	Dal Miller Co Whol Of Metl Cuttg Tools	17355	Darwin Ave		Hesperia	CA	92345-5185	619-949-7779	3545			
668	Dales Grinding	1049	La Cadena Drive West		Riverside	CA	92501	909-682-2101	3541H	7699D		
669	Dallas Machine Inc	4410	Park View Dr		Schnecksville	PA	18078-2550	610-799-2800	3599A			
670	Dama Tool & Gauge Co	13690	172nd Ave		Grand Haven	MI	49417-9431	616-342-9631	3566	3544E		
671	Dan-Ray Machine Co	88	Essex St		Haverhill	MA	01832-5675	508-374-7611	3599A			
672	Daniel Valve	5150	Chuckwagon Trl		Casper	WY	82604-9122	307-235-7940	3829	5063N	3494	
673	Danly Die Set				Los Angeles	CA	90022	213-685-8151	3999L			
674	Danzco Machine Work & Welding Fax	1006	143d Av Se		Tenino	WA	98589	360-264-5105	3599A			
675	Darryls Gear Box	633	Southfield Rd		Lincoln Park	MI	48146-2608	313-382-3760	3711	7537		
676	Data Preference Inc	6	Pearl Ct		Allendale	NJ	07401-1629	201-825-9000	3825B			
677	Data Test Corp		Po Box	298	Coronado	CA	92118	619-435-2800	3825B			
678	Datec Tooling & Development	250	Commercial St		Manchester	NH	03101-1142	603-641-6449	3599A			
679	Daum Products Inc	27075	Cabot Rd		Laguna Hills	CA	92653-7014	714-367-1633	3089			
680	Dave Stern Inc	390	Mclean Blvd		Paterson	NJ	07513-1086	201-684-1433	7538	5531C	7534	3559M
681	David Robin Ironworks	47921	Highway	58	Oakridge	OR	97463-9569	503-782-4652	3599A			
682	Davies Drilling				Seattle	WA	98028	206-439-3234	3541C			
683	Davis Concrete Products Inc	2109	24th St		Phenix City	AL	36867-3856	334-298-4620	7699H	1711K	3443A	
684	Davis Engineering	8217	Corbin Ave		Canoga Park	CA	91306-1946	818-993-0472	3829			
685	Davis Machining Co	3216	Winona Ave		Burbank	CA	91504-2574	818-845-7293	3599A			
686	Davro Instrument Corp	5	& Canon Ave		Lansdale	PA	19446	215-368-2520	3599A			
687	Dayton Electro Machining	2271	N Moraine Dr		Dayton	OH	45439-1507	513-294-7581	3599K	3544D		
688	Dayton Gundrilling & Mach Inc	6549	Webster St		Dayton	OH	45414-2608	513-890-0679	3599A			
689	Dayton Wireburn Inc Fax	2747	Armstrong Ln		Dayton	OH	45414-4225	513-274-0014	3599A			
690	De Angelo Machinery Sales Inc	876	N Lenola Rd		Moorestown	NJ	08057-1046	609-234-2552	3545	3541		
691	Deasey Machine Tool & Die Inc		Rr	1	Everett	PA	15537-9801	814-847-2728	3599A			
692	Deck Machine & Tool	1726	N 22nd Ave		Phoenix	AZ	85009-3005	602-253-1080	3599A			
693	Deco Grinding & Machine	1519	Hill Rd		Houston	TX	77039-5122	713-449-5229	3541H			
694	Deco Welding & Iron Works	3321	W Lincoln Ave		Anaheim	CA	92801-6019	714-758-0231	3548A			
695	Deep Well Threaders Inc		W Hwy	80	Mildland	TX	75959	915-697-0736	3541F			

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696	D[illegible] Equipment & Supply	7037	St Rt	137	Mc Connelsville	OH	43756	614-962-2185	3523	359[illegible]		
697	D[illegible]hine Inc	15235	Herriman Blvd		Noblesville	IN	46060-4230	317-776-1970	3599A			
698	Degu[illegible]anufacturing Inc	25700	D'hondt		Chesterfield Townshi	MI	48043	810-949-3550	3544D	346[illegible]		
699	Deimling Mold & Tool Inc	1190	Ferris Rd		Amelia	OH	45102-1097	513-752-6653	3544E			
700	Dekalb Tool & Die Inc	2220	Stephens Dr		Tucker	GA	30084-4328	770-938-5605	3469	3544D		
701	Delafield Corp	1520	Flower Ave		Duarte	CA	91010-2925	818-303-0740	3494	5085H		
702	Delaware Machinery & Tool C In	700	S Mulberry St		Muncie	IN	47302-2356	317-284-3335	3544D	3544B	3599A	3544E
703	Dell Manufacturing Co Inc	4	Right Ln		Farmington	CT	06032-3148	203-677-8545	3599A			
704	Dellacor Co	1711	Potrero Ave		South El Monte	CA	91733-3097	818-444-5690	3544D			
705	Delltronics Inc	3620	S Huron St		Englewood	CO	80110-3426	303-789-2661	3566	3599A		
706	Delta Control Engineering Inc	1021	Ne 27th Ave		Pompano Beach	FL	33062-4221	305-781-2142	3829			
707	Delta Lok Co	1274	Virginia Ave		Bensalem	PA	19020-5330	215-639-1225	3544D			
708	Delta Machine Works Inc	16	Marion St		Hackensack	NJ	07601-6824	201-487-8769	3599A			
709	Delta Measurements & Control	4	Evergreen Ln		Hopedale	MA	01747-1536	508-478-5565	3829			
710	Delta Valve Rebuilders Inc	295	Moore St		Harrisburg	OR	97446	503-995-6138	3594C	3494		
711	Deluxe Diecutting	2600	Fernbrook Ln N		Plymouth	MN	55447-4752	612-559-7389	3999L			
712	Dema Engineering	1365	Grand Ave		San Marcos	CA	92069-2455	619-471-8787	3599A			
713	Dennco Supply Inc	4112	83rd Ave N		Minneapolis	MN	55443-2530	612-560-0704	3291	2891	3569	5085D
714	Dennis Johns Machine Shop	9009	Poison Oak Rd		Temple	TX	76502-5481	512-939-7790	7538C			
715	Dennis Tool Co	2020	Rankin Rd		Houston	TX	77073-5100	713-821-9495	3541			
716	Denver Die Mold Inc	12410	W Cedar Dr		Denver	CO	80228-2002	303-986-5559	3544E	3089		
717	Dependable Centerless Grinding Co	20516	Lorne St		Taylor	MI	48180-1901	313-383-1334	3541H			
718	Dependable Precision Products Co Inc	267	1st Ave		Roselle	NJ	07203	908-245-0716	3599A			
719	Dependable Sheet Metal Company Inc	2964	Mill St		Mobile	AL	36607-1916	334-473-3515	3365	2842	1791D	1761
720	Descote Inc	4151	Southwest Fwy		Houston	TX	77027-7320	713-622-5575	3494			
721	Design Casting	21628	N Central Ave		Phoenix	AZ	85024-5110	602-516-0562	3363			
722	Despatch Machine Co Inc	130	Despatch Dr		East Rochester	NY	14445-1448	716-586-7637	3599A			
723	Detco Manufacturing		Race & Myers		Irwin	PA	15642	412-863-8765	3599A			
724	Detroit Ball Bearing Co	404	Kelso St		Flint	MI	48506-4031	810-238-9633	3562	3494	3568	
725	Detroit Pump & Manufacturing Co	400	Dartmouth Dr		Midland	MI	48640-4598	517-832-9611	3599E	5084G		
726	Detroit Pump & Mfg Co	3212	S Dye Rd		Flint	MI	48507-1006	810-733-7700	5084G	3599E		
727	Detroit Tubular Rivet Inc	1213	Grove St		Wyandotte	MI	48192-7086	313-386-2334	5085	3452		
728	Deutz-Allis Lennox Equipment Inc		Po Box	457	Lennox	SD	57039-0457	605-647-5285	3523	5261C		
729	Devlin Electric	3410	Eva Dr		Concord	NC	28027-5544	704-782-1331	3829	1731		
730	Dewey Machine & Tool Inc	49	James St		Homer	NY	13077-1221	607-749-3930	3599A			
731	Dexter Tool Co	1	Crow Point Rd		Central Falls	RI	02863-1607	401-722-8344	3599A			
732	Di Eugenio Tool Center Inc	1120	S Black Canyon Hwy		Phoenix	AZ	85009-5857	602-258-8364	3545			
733	Di-Al Machine Co	10	Mechanic E		North Brookfield	MA	01535	508-867-2366	7999P	3599A		
734	Diamond Drill Contracting Co	1015	N Yardley Rd		Spokane	WA	99212-0961	509-534-1588	3541C			
735	Diamond Perforated Metals Inc	17915	S Figueroa St		Gardena	CA	90248-4212	310-327-9172	1791D			
736	Diansuply Inc	4505	Green Park Rd		Saint Louis	MO	63123-7201	314-892-8597	3999L			
737	Diboll Scale Models	237	Davis Ave		Pass Christian	MS	39571-4505	601-452-4480	3999A			
738	Dickerson Manufacturing	2761	W Oxford Ave		Englewood	CO	80110-4365	303-781-1280	3599A			
739	Dicky Robert R Co Inc Industrial Dist	7601	Seneca St		East Aurora	NY	14052-9457	716-652-1445	3494			
740	Die Supply Co	2532	Converse St		Dallas	TX	75207-5904	214-630-4695	3999L			
741	Dies Inc	1519	Atlantic Ave		Kansas City	MO	64116-3910	816-474-9488	3999L			
742	Dihco Inc	612	E Crescent Ave		Saddle River	NJ	07458-1827	201-327-0518	3599A			
743	Dimar Systems		N Of Las Cruces		Las Cruces	NM	88000	505-522-1747	5063A	5063E	3999	
744	Dimension Mold & Design	204	S River Dr		Tempe	AZ	85281-3056	602-966-1088	3544E			
745	Dimensional Mold Engineering Inc	1977	Rochester Industrial Dr		Rochester Hills	MI	48309-3344	810-651-7600	3544E	3089		
746	Dimi Tech	7591	Yates St		Westminster	CO	80030-4612	303-427-3596	3999A			
747	Dimold Co Inc	1020	E Elizabeth Ave		Linden	NJ	07036-2230	908-925-5114	3544E			
748	Direct Design	631	E Washington St		Saint Henry	OH	45883-9683	419-678-8021	3544D			
749	Diversified Electl Prods Inc	1430	Church St		Bohemia	NY	11716-5027	516-567-5710	3699			
750	Diversified Machining Co	200	N Bagdad Rd		Leander	TX	78641-7802	512-259-0008	3599A			
751	Diversified Mfg Inc	410	Ohio St		Lockport	NY	14094-4291	716-625-9567	3541			
752	Diversified Tool & Development	151	Hanger Cir		Richmond	KY	40475-3246	606-624-2202	3451			
753	Dixon Systems & Components		Allaireairport		Farmingdale	NJ	07727	908-938-5858	3562	3494		

754	Di [illegible] e & Coupling Co	3975	York St		Denver	CO	80205-3537	303-297-9912	3494			
755	D [illegible] Co	1013	N Ciero Ave		Chicago	IL	60644	312-287-7722	3599A			
756	Do All Plastic Inc	1265	Terminal St		Detroit	MI	48214-3444	313-824-6565	3544E	3089		
757	Dobday Manufacturing Co Inc Tools	42750	Merrill Rd		Sterling Heights	MI	48314-3244	810-254-6777	3599A			
758	Domino Electronics	5800	Fairfield Ave		Fort Wayne	IN	46807-3400	219-456-5512	3829	7382A		
759	Don Johns Inc/Pbm Valves	1800	Macleod Dr		Lawrenceville	GA	30243-5736	770-995-6838	5063N	5084G	3494	
760	Donelson R E Co Inc Mfr Agt	16822	Se River Rd		Milwaukie	OR	97222	503-654-3137	3829			
761	Dons Petroleum Equipment Sales & Service	11897	Debonair St Ne		Moses Lake	WA	98837-9576	509-765-1114	3563	1794	3599E	
762	Dooley Arthur & Sons Inc	314	Center St		Deer Park	TX	77536-2738	713-479-9700	3999	3569E	5084J	
763	Dora Supply Co Inc	11625	Walsingham Rd		Largo	FL	34648-2498	813-584-2163	3291	7359A	5251	5192B
764	Dorvison Automatic Screw	4293	Hamann Pkwy		Willoughby	OH	44094	216-946-7061	3599A			
765	Double D Enterprises Mfg		Hwy 59 N		Gentry	AR	72734	501-736-2417	3369	3599A	7692D	
766	Double D Mach And Tool Co	2116	Napoleon Rd		Fremont	OH	43420-1577	419-332-4871	3599A	3599F	3544D	
767	Double E Grinding & Machine	220	S 5th		Capron	IL	61012	815-569-2236	3599A			
768	Dow Engineering Co	278	Bridge Rd		Salisbury	MA	01952-2410	508-462-7507	3599A			
769	Dpi Inc	1310	Indstrl Blvd		Southampton	PA	18954	215-953-1192	3599A			
770	Dresser Security	1676	N Ventura Ave		Ventura	CA	93001-1576	805-648-7777	3541C			
771	Dresser-Rand Company Services Division	1354	S Sheridan Rd		Tulsa	OK	74112-5416	918-835-8437	3599A	3561		
772	Drill & Tap Disintegrating	5161	Sisson Dr		Huntington Beach	CA	92649-2439	714-840-0787	3599A			
773	Drill Parts & Service Company In		Ruffner Rd		Irondale	AL	35210	205-956-0684	3541C			
774	Drillco Equipment Co Inc		14620-E Flint Lee Rd		Chantilly	VA	22021-1517	703-631-3222	3541C			
775	Drillmaster Inc	1112	N Commercial Blvd		Arlington	TX	76010	817-467-4845	3541C			
776	Drive Line Specialists Inc	917	Nw 1st St		Fort Lauderdale	FL	33311-8998	305-463-7711	3714B	5531B	5531	
777	Drive Shaft Service Co	4838	West Ave		San Antonio	TX	78213-2704	210-342-6622	7538C	3714B	3599A	5531A
778	Drive Train Ind	1829	E Mulberry St		Fort Collins	CO	80524-3525	970-493-3277	5013	3714	3714B	3568
779	Driveshaft Specialists	3401	Everett Ave		Everett	WA	98201-3814	206-259-6074	3714B	3599E	3599A	3441
780	Dublbee Mfg	7064	Gerald Ave		Van Nuys	CA	91406-3709	818-989-1020	3599A			
781	Dublin Machinery	30	Grove St		Pittsford	NY	14534-1334	716-586-6187	3541			
782	Dugan Tool & Die Co	4005	Lagrange St		Toledo	OH	43612-1428	419-476-1639	3544B	3599A	3544D	
783	Dun-Rite Industries Inc	3232	South Ave		Toledo	OH	43609-1195	419-385-5359	3544D			
784	Dun-Rite Machine Inc	70	S Franklin St		Nyack	NY	10960-3734	914-358-0869	3599A			
785	Duncan Engineering & Equipment	11354	Burbank Blvd		North Hollywood	CA	91601-2441	818-760-4100	3531A	9511A	3479	2899
786	Dunham Products Inc	6	Industry Dr		Cleveland	OH	44146-4414	216-232-0885	3541H			
787	Dunlap Machine Products Lake Havasu City	1010	Empire Dr		Lake Havasu City	AZ	86404-2465	520-453-1011	3599A			
788	Dunns Die Co	4300	Fruitridge Rd		Sacramento	CA	95820-5102	916-421-1901	2759J	3999L		
789	Duor Die Corp	273	Manufacturers Dr		Westland	MI	48185-4038	313-729-4452	3363			
790	Duval Plastics Inc	2941	Edison Ave		Jacksonville	FL	32254-4363	904-389-1277	3599A	3087		
791	Dybec Corp	9	Whippany Rd		Whippany	NJ	07981-1540	201-887-4183	3829			
792	Dyer Technology Inc	17	Dracut Rd		Hudson	NH	03051-5055	603-889-6470	3829			
793	Dyers Tool And Die	379	S Long Hollow Rd		Maryville	TN	37801-8381	615-983-7593	3544D			
794	Dyko Inc	8021	W Sunset Hwy		Spokane	WA	99204-9019	509-747-4139	3369	3599A		
795	Dynamic Grinding	1628	Industrial Ave		Norco	CA	91760-2947	909-735-8096	3541H			
796	Dynatrol Inc	61	Kansas St		Hackensack	NJ	07601-5351	201-488-0782	3494			
797	Dynetic Industries Inc	540	N Main St		Manchester	CT	06040-1963	203-646-1763	3599A			
798	Dynomach Inc	1208	Commercial Dr		Port Allen	LA	70767-3226	504-383-3119	3599A			
799	Dysten Inc	1500	145th St		Little Rock	AR	72206-5865	501-897-4300	3599A	3544D		
800	E & R Machine Products	405	Travis La		Waukesha	WI	53186	414-544-5990	3599A			
801	E & S Service	1366	N Bay Dr		North Bend	OR	97459-9576	503-756-2567	7538C	7538	7538U	3599A
802	E B Manufacturing Co Inc		Old Indian Trl		Middlefield	CT	06455	203-349-1765	3599A			
803	E D C A Inc	35	S Walnut St		La Crescent	MN	55947-1338	507-895-6012	3452			
804	E D M Exotics	1984	National Ave		Hayward	CA	94545-1710	510-783-2284	3599K	3599A		
805	E D M Metal Works	2646	Palma Dr		Ventura	CA	93003-7743	805-658-7658	3599A			
806	E E B Inc	605	Sunset Ln		Saint Clair Shores	MI	48082-1246	810-415-8336	3089			
807	E N V Engineering	7625	Rosecrans Ave		Paramount	CA	90723-2507	310-630-4585	3599A			
808	E O Mfg Co		Horton Pl		West Haven	CT	06516	203-932-5981	3599A	7692D		
809	E Ritter Equipment Company	116	Hwy 63 West		Marked Tree	AR	72365	501-358-2555	3523	4971	5261C	3599A
810	E T J Corporation	13807	Avenue K		Austin	TX	78728-7604	512-251-5849	3599A			
811	E T Tool Inc	1333	23rd St		Racine	WI	53403-3313	414-637-0474	3544D	3544B		

[redacted]12	E[redacted]ending Machine[redacted]	[redacted]	[redacted]way	[redacted]	[redacted]	[redacted]	[redacted]	334-621-8102	[redacted]	22[redacted]		
813	E[illegible] Aluminum Corp	186	Eagle Mills Rd		Sonora	KY	42776-9729	502-369-8033	3334	1[illegible]	355	
814	Ea[illegible]k Technologies	2146	W Dell Rd		Bath	PA	18014-9648	610-759-5200	3541			
815	Eagle Tool Inc	1256	Jackson St		Columbus	IN	47201-5774	812-372-0612	3544D			
816	Earl Ralph W Company Inc	1320	Buffalo Rd		Rochester	NY	14624-1839	716-235-7602	3511	5084V	3494	5072D
817	Earthtech Drilling Co	644	Locust St		Sandy	UT	84070-1706	801-566-5417	3541C			
818	East Coast Industries	2352	Main Concord-Acton Industr		Concord	MA	01742	508-897-8976	3599A	5039	5051D	7692D
819	East Coast Rebuilding Co	165	Field		Farmingdale	NY	11735	516-249-3020	3599E			
820	East Coats Marine Brokers	677	George King Blvd		Cape Canaveral	FL	32920-4511	407-784-5982	3731	7389H		
821	East End Iron Works	7280	Sound Ave		Mattituck	NY	11952-3134	516-298-0124	3548A			
822	East Point Foundry Inc Castngs	1312	Central Ave		East Point	GA	30344-4936	404-762-1737	3321	3369	3543	5999E
823	East Tennessee Die	866	Hopewell St		Dandridge	TN	37725-4800	615-397-0601	3999L			
824	Eastern Vent Systems	571	Mammoth Rd		Pelham	NH	03076-2158	603-595-8559	1711	3444		
825	Econo Hydraulic Services	2199	Lemuria St		Eugene	OR	97402-1019	503-688-0990	3599E			
826	Edco Precision	7428	Varna Ave		North Hollywood	CA	91605-4010	818-982-0040	3599A			
827	Edgar Industries		Merwin Rd		New Kensington	PA	15068	412-339-6694	3599A	3599F	3441	
828	Edgecomb Metals Co	401	Harding St Ne		Minneapolis	MN	55413-2888	612-331-4000	5051A	3325		
829	Edm Source	9826	S Paintr Ave		Santa Fe Springs	CA	90670	310-698-5502	3599K			
830	Edwards Inc				Raleigh	NC	27615	919-847-4224	1389J	3536	1711	1791D
831	Edwards Machine & Tool Company	2504	Franklin Ave		Waco	TX	76710-7434	817-754-1632	3599A	1791D		
832	Efficiency Machining Services	5885	Louisville Rd		Coxs Creek	KY	40013-7702	502-348-0076	3599A	3544D		
833	Efi Inc	21	Carlstadt Rd		Parsippany	NJ	07054-2634	201-515-9281	3829			
834	Elcam Tool & Die Inc		Rt	321	Wilcox	PA	15870	814-929-5831	3599A	3544D		
835	Eldridge Welding & Machine Co	523	14th St		Des Moines	IA	50309-3103	515-244-0932	3566	3599A	7699	7692D
836	Electrical Power Products Inc	121	Woody Creek Rd		Greer	SC	29650-3039	803-244-9634	3699			
837	Electronic Circuits Inc	3102	W Lewis Ave		Phoenix	AZ	85009-1509	602-272-6052	8711J	3369		
838	Electronic Equipment Company I	2550	N Powerline Rd		Pompano Beach	FL	33069-5901	305-960-1200	3679B	3825B		
839	Electronics Stamping Corp	19920	S Alameda St		Compton	CA	90221-6210	310-639-2120	5065	3469		
840	Electrum Recovery Works Inc	827	Martin St		Rahway	NJ	07065-5409	908-396-1616	3339			
841	Elemco Building Controls Inc	1324	Motor Pky		Hauppauge	NY	11788-5226	516-582-8266	3829			
842	Elias Iron Works	9553	Rush St		South El Monte	CA	91733-1536	818-579-3771	3548A			
843	Elite Die & Fininshing Inc	13636	Westrn Ave		Blue Island	IL	60406	708-389-4848	3999L			
844	Elite Machine Shop	1102	Hillsborough Av E		Tampa	FL	33604	813-237-6997	7538C			
845	Elkhorn Tool & Mfg				Elkhorn	NE	68022	402-289-4770	3599A	3544D		
846	Elliott Metal Works	210	Old Piedmont Hwy		Greenville	SC	29605-4515	803-269-8930	3599A	1791D	3552	
847	Elliott Technical Sales	2717	Tattersall Rd		Kalamazoo	MI	49002-3158	616-327-1311	3369			
848	Ellis Tool & Machine Inc				Tom Bean	TX	75489	903-546-6540	3599A			
849	Elmec Prdts Co	2712	N Elston Ave		Chicago	IL	60647-2021	312-384-2630	3544D	3469		
850	Elmira Heat Treating Inc	407	S Kinyon St		Elmira	NY	14904-2398	607-734-8904	3398			
851	Elms Richard Hydraulic Service	10009	Lanehart Rd		Little Rock	AR	72204-8717	501-455-2261	3599E			
852	Emerson Industrial Controls		2716-G Interstate St		Charlotte	NC	28200	704-393-3366	3829	3699	5063C	
853	Emerson Sales & Service	30	W Kneeland Rd		Mio	MI	48647-9706	517-826-3388	3711	5084L	5261C	5941H
854	Emg Inc Machine Shop		Po Box	4394	Santa Rosa	CA	95402-4394	707-578-7260	3599A			
855	Emi Company	603	W 12th St		Erie	PA	16501-1508	814-452-6431	3321	3322		
856	Emory Machine & Tool Co Inc	55	Fessenden St		Rochester	NY	14611-2815	716-436-9610	3599A	3451		
857	Emrick Machine Tool Rebuil	2372	S Taylor Ave		Fresno	CA	93706-4528	209-233-6115	3541H	3599D	5084D	3599E
858	Enduro Enterprises	1960	Holly Ave		Lake Havasu City	AZ	86403-2801	520-855-7888	3599A			
859	Energy Battery Inc	902	N Port Ave		Corpus Christi	TX	78401-1614	512-882-5531	3691	3699D		
860	Energy Reduction Systems		Mountain Rd		Stowe	VT	05672	802-253-7385	3829			
861	Energy Tech Services Inc	1422	E Broadway Ave		Bismarck	ND	58501-4664	701-222-2999	3829	8748B		
862	Engbrecht Tool	404	Umbarger Rd		San Jose	CA	95111-2035	408-224-2138	3599A			
863	Engine Dynamics	202	N 19th St		Lincoln	NE	68503-3668	402-435-1259	7538C			
864	Engineered Flow Controls	1227	Market St		Longview	TX	75604-5665	903-759-0126	3498	3494		
865	Engineered Production Equip	8461	Lake St		Omaha	NE	68134-6329	402-399-8282	3599F	3544D		
866	Engineered Products Inc Louisi	4916	Hazel Jones Rd		Bossier City	LA	71111-5436	318-747-1620	3089	3544D		
867	Engineered Sales & Service Inc	709	Air Park Rd		Ashland	VA	23005-3209	804-798-9056	3829			
868	Engineered Systems & Equipment Inc				Caney	KS	67333	316-879-5841	3599A			
869	Engineered Systems Inc	750	Exeter Rd		Hampton	NH	03842-1022	603-778-7393	3829			

870	E[illegible]eering Concepts Inc	4307	Progress Blvd		Louisville	KY	40218-3415	502-458-1492	3544E			
871	E[illegible]g Products Associate	7336	Ohms Ln		Minneapolis	MN	55439-2330	612-835-9022	5065	3[illegible]		
872	Engines & Equipment Technologies Inc	1201	Poinsett Hwy		Greenville	SC	29609-3629	803-233-4411	5084L	3621	3569	5261C
873	Environ Service Inc	506	Charles St		Lansing	MI	48912-3802	517-371-4343	7623	5075	3829	8711K
874	Environmental Operations Inc				Cedar Rapids	IA	52402	319-393-6155	1799V	3541C	8711F	8711M
875	Environmental Products Inc	1	Sandlily Ct		Spring	TX	77380-0953	713-363-4868	3494	3561	3511	9511B
876	Envirotronics Inc	1200	Woodruff Rd		Greenville	SC	29607-5730	803-627-0048	3569			
877	Epc Identification Systems	505	Martin Ave		Rohnert Park	CA	94928-2065	707-585-8811	3569H	2672A		
878	Equipment Design & Fabrication Inc	722	N Smith St		Charlotte	NC	28202-1454	704-372-4513	3535	3599F	5084E	3441
879	Equipment Engineers Inc	2020	Old Forty Foot Rd		Harleysville	PA	19438	215-393-1800	3599E	3561		
880	Equipment Repair Inc	1803	Mcguckian St		Annapolis	MD	21401-4023	410-269-5331	3559M			
881	Equus Mfg	16727	Parkside Ave		Cerritos	CA	90703-1840	310-404-4849	3599A			
882	Erdle Perforating Of Carolina Inc	10721	John Price Rd		Charlotte	NC	28273-4529	704-588-4380	3089			
883	Ericksen Pump Co	17531	S Henrici Rd		Oregon City	OR	97045-9338	503-631-2049	5084G	3599E	3561	
884	Ernst-Eichman Machinery Corp	15541	W 110th St		Shawnee Mission	KS	66219-1393	913-492-2770	3545	3541		
885	Erpel Design Corp	841	Tech Dr		Telford	PA	18969-1183	215-723-5577	3444	1761		
886	Escofab Inc	2	Po Box		Atmore	AL	36504	334-368-1261	3469			
887	Eslinger Drilling & Pump Service	897	Mcwilliams Dr		Corvallis	MT	59828-9465	406-961-4175	3541C	5084G	3599E	5082H
888	Esr Industrial & Machine	120	Ne 20th St		Miami	FL	33137-4814	305-576-0192	3599A	3599E	3731	
889	Essex-Silver Line Corp	1118	Lakeview Ave		Dracut	MA	01826-4739	508-957-2116	3291	7359A	3589	
890	Euroma International Inc	3200	Oakcliff Industrial St		Doraville	GA	30340-2904	770-457-0708	3544E	3089		
891	Ev-Rite Tool		Rr 132 Elm		Westfield	MA	01086	413-568-1433	3599A			
892	Evans Machining Service	314	State St		Clairton	PA	15025-1914	412-233-3255	3599A			
893	Evans Metal Fabricators	18155	Sw Baseline Rd Ste D		Aloha	OR	97006-7529	503-690-3025	1791D			
894	Evarts Machine Co	21	Francis Ave		West Hartford	CT	06106-2102	203-523-9796	3599A			
895	Evelyn Place Inc	1	Market St		Passaic	NJ	07055-7306	201-779-1397	3545			
896	Ever Ready Thermoneter Co Inc	228	Lackawanna Ave		Little Falls	NJ	07424-2977	201-812-7474	3823			
897	Eveready Mc Callum Machinery	135	Roosevelt Dr		Derby	CT	06418-1647	203-732-5497	3599E			
898	Evergreen Imports Inc	45437	Warm Springs Blvd		Fremont	CA	94539-6104	510-226-6647	3999			
899	Evergreen Testing & Environmental Services	65	Oliver St		Cohoes	NY	12047-4730	518-238-2915	1799V	3541C	8711D	8734
900	Exair Corp	1250	Century Cir N		Cincinnati	OH	45246-3300	513-671-3322	3544B			
901	Excel Screw Machine Tool Co	20300	Lorne St		Taylor	MI	48180-1969	313-383-4200	3451			
902	Excell Equipment Co	2816	E 51st St		Tulsa	OK	74105-1737	918-749-0377	3494			
903	Exchange Tool & Supply Inc	9100	Ambassador Row		Dallas	TX	75247-4599	214-631-7720	3429A	3569	3541	5084D
904	Executive Safelife Inc	174	S Main St		Hackensack	NJ	07601-5209	201-342-6661	3569E			
905	Experimental Machine Tool & Plating Co	58	River St		Troy	NY	12180-4448	518-271-2500	3599A			
906	Ezemach	347	Coral St		Santa Cruz	CA	95060-2106	408-426-1296	3599A			
907	F & F Auto Supply Inc	720	E Highway	90	Uvalde	TX	78801-5719	210-278-3341	7538	5531A	3599A	
908	F & F Tool Mach Shop	515	Ne 27th St		Pompano Beach	FL	33064-5433	305-782-6683	3599A			
909	F & G Manufacturing Inc	68	W Commercial Ave		Moonachie	NJ	07074-1703	201-460-0360	3599A			
910	F & H Nozzles	505	N Yosemite St		Stockton	CA	95203-2749	209-464-1651	3544B			
911	F & J Mach & Tool	2930	Gradwohl Rd		Sylvania	OH	43560	419-841-8628	3599A			
912	F & M Machine & Mfg Co	2680	S 5th Ave		Oroville	CA	95940	916-533-8440	3599A	7692D		
913	F & M Machine Inc	5107	Ne 12th Ave		Oakland Park	FL	33334-4918	305-493-5215	3599A	1791D		
914	F & T Electronics Die Corp	3707	35th St		Long Island City	NY	11101-1601	718-937-9570	3544D			
915	F E Bradley Corporation Texas	4007	Greenbriar St		Stafford	TX	77477-3923	713-240-2002	3823			
916	F I M S Manufac	162	Central Ave		Rochelle Park	NJ	07662-4003	201-845-7088	3599A			
917	F M Screw Machine Products Inc	1800	S 15th Ave		Maywood	IL	60153-3078	708-681-0051	3451			
918	F/X Production Services Inc	7530	Currency Dr		Orlando	FL	32809-6923	407-856-1080	7389	7389L	2892	3699C
919	Fab Tech	1204	Tappan Cir		Carrollton	TX	75006-6911	214-245-2250	3599A			
920	Faber Mechanical Products Inc	1111	Paulison Ave		Passaic	NJ	07055	201-546-7900	5075B	3569D		
921	Fabrico Electrical Insulation Suppliers Inc	8675	Rochester Ave		Rancho Cucamonga	CA	91730-4906	909-944-5522	3699			
922	Fad Tool Co	32	Valley St		Bristol	CT	06010-4991	203-582-7890	3541	8731B	3599A	
923	Fahrion Karl Sheet Metal Inc	1000	Constance St		Pittsburgh	PA	15212-5037	412-321-1233	3399	1761		
924	Faia Machine Co	43	Toledo St		Farmingdale	NY	11735-6620	516-249-5092	3599A			
925	Faith Tool And Mfg Inc	36575	Reading Ave		Willoughby	OH	44094-8210	216-951-5934	3599A	3544E		
926	Falcon Machine Co	1702	Riverdale St		West Springfield	MA	01089-1053	413-737-5842	3599A			
927	Falline Corp	4802	Longley Ln		Reno	NV	89502-5952	702-827-6400	5944Z	3479D	3089	5162H

928	Falls City Machine Technology	667	S 31st St		Louisville	KY	40211-1469	502-772-3621	3398	35[illegible]	3599F	3441
929	F[illegible] & Die Co Inc		Woodford Av Ext		Plainville	CT	06062	203-225-0800	3544D	3[illegible]		
930	Fa[illegible] Northwest Inc	7115	W Marginal Way		Seattle	WA	98028	206-767-7700	3498	52[illegible]	5074C	
931	Farm Supply Company San Luis Obispo Pump	675	Tank Farm Rd		San Luis Obispo	CA	93401-7002	805-543-4355	5084G	3599E		
932	Farmers Welding & Machine		16883-9th		Coalinga	CA	93210	209-945-2390	3599A	7692D		
933	Fase Controls Inc	59	Georgetown Cir		O Fallon	MO	63366-8549	314-926-9156	3829			
934	Fastenal	1203	Mulberry St		Terre Haute	IN	47807-2779	812-232-6000	5551	3732	3452	
935	Fasteners Inc	35	Budney Rd		Newington	CT	06111-5100	203-666-1551	3452	5085		
936	Fastening Specialty Maui In	355	Hukilike Unit	123	Wailuku	HI	96793	808-871-6217	5085G	5051R	3545	5072E
937	Fastner Hardware Inc	130	Indstrl Dr		Ivyland	PA	18966	215-355-6641	3599E			
938	Father & Sons Sprinklers	5996	Ne 22nd Way		Fort Lauderdale	FL	33308-2623	305-491-0880	3599E	5083J		
939	Federal Iron Works Co The	100	N Prospect Ave		Youngstown	OH	44506-1268	216-746-6391	3365	5099A	3446	5072K
940	Felco Transportation Inc	10001	Derby Ln		Maywood	IL	60153	708-681-2090	3721			
941	Femco Of Florida Inc Mach Shop	1700	Nw 33rd St		Pompano Beach	FL	33064-1307	305-978-3838	3599A			
942	Fenn Manufacturing Co	60	Brookdale Rd		Springfield	MA	01104-3206	413-747-9151	3599A			
943	Ferguson Enterprises Inc	1275	Chatham Pkwy		Savannah	GA	31401	912-234-2211	5722B	5719I	3498	5211O
944	Ferguson Enterprises Inc	2220	Se Lakewood Blvd		Topeka	KS	66605-1170	913-354-4305	3498	5211O	3088	7299O
945	Ferrell Jerry Inc	3147	Eastpointe Dr		Medina	OH	44256-8233	216-723-3105	5571	3711		
946	Fetter Enterprizes Inc	30	Lincoln Hl Nw		Quincy	IL	62301-4406	217-228-3212	3542			
947	Fgs Tool Co		Po Box	19734	Seattle	WA	98109-6734	206-285-2654	3544D			
948	Fibre Metal Mold Tool & Die Inc		Baltimorepke & Brinsonlakerd		Concordville	PA	19331	610-358-1192	3544D	3599A	3544E	
949	Fick & Associates	7406	27th St W		Tacoma	WA	98466-4632	206-564-9407	3369			
950	Fiden Industrial Corp	3960	Harlem Rd		Amherst	NY	14226-4706	716-839-3500	3541			
951	Fidler Inc Corporate Office	1700	Egbert Ave		Goshen	IN	46526-4214	219-533-0415	3271	3272	3443A	5032F
952	Fife Industrial Pipe Co	1625	State Rd 60 Brandon		Brandon	FL	33511	813-681-3765	8711M	3498		
953	Fifth Avenue Plastics	134	E Pomona Ave		Monrovia	CA	91016-4656	818-305-0900	3089			
954	Fikeco Inc		U S Highway 27 S		Cynthiana	KY	41031	606-234-2878	1791D			
955	Filter Concepts Inc		14720-D Flint Lee Rd		Chantilly	VA	22021-1503	703-263-9775	3291			
956	Filter Materials	1401	Ware St		Waupaca	WI	54981-1365	715-258-5525	3569D			
957	Fire Control Technologies				Hudson	MA	01749	508-562-3002	3999	3569E		
958	Fire Equipment Company				Ocean City	MD	21842	410-289-5580	3569E			
959	Fire Systems Inc	1975	Airport Industrial P		Smyrna	GA	30080	770-955-5673	7382A	3569E		
960	Fire Technologies				Cavendish	VT	05142	802-226-7444	3999			
961	Fischer Mold Inc	393	Meyer Cir		Corona	CA	91719-1078	909-279-1140	3089			
962	Flex Manufacturing Inc	7190	Conservation St Ne		Ada	MI	49301-9584	616-676-8846	3599A			
963	Flexitallic Services	2007	Preston Ave		Pasadena	TX	77503-2922	713-920-2400	3569			
964	Flinchbaugh Electric Co Div Of Powermet	321	Court St		Port Huron	MI	48060-5409	810-985-7197	5063C	3599E	7699P	3577
965	Flippin Fiberglass				Yellville	AR	72687	501-449-6061	3714			
966	Flores Enterprise	1729	E 28th St		Signal Hill	CA	90806-1923	310-595-1313	3599A			
967	Florida Discharge Machining Co	5148	113th Ave N		Clearwater	FL	34620-4835	813-573-1588	3599K			
968	Florida Fasteners & Equipment	7805	Nw 57th St		Miami	FL	33166-3527	305-594-2266	3545	3291	0919	3531C
969	Florida Hydronics Inc	2929	Edison Ave		Jacksonville	FL	32254-4313	904-389-1322	3599E			
970	Florida Machining Cntr	4986	113th Ave N		Clearwater	FL	34620-4831	813-573-1601	3599A			
971	Florig Equipment Co Inc	906	W Ridge Pike		Conshohocken	PA	19428-1098	610-825-0900	3714B	7539J	3599A	3441
972	Flotec	8132	Woodland Dr		Indianapolis	IN	46278-1350	317-875-8136	3494	3845		
973	Flow Control System	1007	E Admiral Blvd		Tulsa	OK	74120-1601	918-587-9401	3494			
974	Flow Engineering Inc	987	Commercial St		Palo Alto	CA	94303-4908	415-493-7444	3494			
975	Flow Inc	44	N Watertown	32882	Hartland	WI	53029	414-367-1055	3829			
976	Fluid Evacuators	1902	E Inca Cir		Mesa	AZ	85203-2875	602-461-8700	3569J			
977	Fluid Power Components Inc	6730	Suermac Pl		Jacksonville	FL	32203	904-781-5337	3511	3494	3594A	5072D
978	Fluorocarbon K S Division	2116	Farallon Dr		San Leandro	CA	94577-6694	510-351-8230	3089			
979	Flurer Machine & Tool Co		W Prospect		Nazareth	PA	18064	610-759-6114	3599A			
980	Forage King Industries Inc				Ridgeland	WI	54763	715-949-1020	3523			
981	Foreign & Bamerican Machine Shop	711	E Main St		Meriden	CT	06450-6018	203-237-3502	7538C			
982	Forgings & Stampings Inc	1025	23rd Ave		Rockford	IL	61104-7198	815-962-5597	3312			
983	Fort Worth Bolt & Tool Co	2822	Bledsoe St		Fort Worth	TX	76107-2902	817-335-3361	3452	3545	5085G	7359E
984	Fortna Equipment Co Inc	2120	S Holly St		Denver	CO	80222-5606	303-756-6066	3291	7538	3471C	5082N
985	Fortner & Gifford Machine Shop	428	N Mount Vernon Ave		Prescott	AZ	86301-2695	602-267-7352	3599A			

986	Fo[illegible]dry Systems International	4555	Corporate Dr		Troy	MI	48098-6338	810-952-5339	3369			
987	F[illegible]s Machine Shop	716	Pennsylvania Ave		Joplin	MO	64801-4621	417-624-3105	7538C			
988	Fou[illegible] Corp	518	W Ocean Ave		Boynton Beach	FL	33426-4383	407-734-1100	3498	505[illegible]D		
989	Fowler Machine & Welding	1146	Cavender Rd		Resaca	GA	30735	706-277-3111	3599A			
990	Fran-Dan Corp	188	Charles St		Cambridge	MA	02141-2118	617-547-1503	3452	5085	3451	
991	Franchino Mold & Engineering	3100	Hart Rd		Jackson	MI	49201-8746	517-787-0140	3544D			
992	Frans Hydraulic Repair Service	21	Lincoln Hwy E		Jeannette	PA	15644-3135	412-527-5511	3599E	3569		
993	Frasal Tool Co	14	Foster St		Newington	CT	06111-4906	203-666-3524	3541			
994	Frasers Bronze Foundry Inc	3207	1st Ave S		Seattle	WA	98134-1619	206-624-1064	3369	5551		
995	Fraziers Drilling & Pump Serv	614	Hibbs Rd		Grove City	OH	43123	614-871-1084	3599E	1781		
996	Fredon Corp	7911	Enterprise Dr		Willoughby	OH	44094	216-951-5200	3599A			
997	Fremont Machine & Tool		Rr 1 Box	138	Fremont	NE	68025-9736	402-721-9261	3599A	3544D		
998	Fresno Paper Box Co	2192	S Railroad Ave		Fresno	CA	93721-3485	209-485-9120	2653	3999L		
999	Fresta Components Corp	2307	Bellmore Ave		Bellmore	NY	11710-5624	516-221-1975	3599A			
1000	Frew W R Co Inc	2144	E 52nd St		Indianapolis	IN	46205-1408	317-253-3271	5099C	3829		
1001	Frick Machinery/Daniel		Rr	2	Merrill	WI	54452-9802	715-536-4985	3599			
1002	Friction Coating	42776	Mound Rd		Sterling Heights	MI	48314-3254	810-731-0990	3291	7699	3541H	3599A
1003	Fritts J E & Assoc Inc		Voorhees Twp Area		Voorhees	NJ	08043	609-795-2090	3541C			
1004	Frontier Advtng Prods	120	Northwd		West Seneca	NY	14210	716-674-7720	7319	5943	3999F	
1005	Fryma Inc	40	Ethel Rd		Edison	NJ	08817-2249	908-248-0700	3531A	3569		
1006	Fulgham Machine & Tool Co	2421	E Mich		Jackson	MI	49202	517-783-6522	3599A			
1007	Furon Advanced Components Division	3711	S Hudson St		Seattle	WA	98118-1919	206-723-5600	3089			
1008	Furtados Machine Shop	332	Phelan Ave		San Jose	CA	95112-4103	408-286-2524	7538C			
1009	Fusion Fabricating Inc	1519	N Cicero Ave		Chicago	IL	60651-1619	312-486-7575	3599A	3441	1799	
1010	Fyr Fyter Inc		10905-1 Gladiolus Dr		Fort Myers	FL	33901	941-481-5737	5063A	5063E	7382A	3569E
1011	Fyr Fyter Of Missouri Inc				Columbia	MO	65205	314-449-4303	3999	3569E		
1012	Fyre-Tec	432	Mandeville St		Utica	NY	13502-4610	315-733-2321	7382A	3569E		
1013	G & A Division	333	Hamilton Blvd		South Plainfield	NJ	07080-3339	908-753-2050	3599A	3398		
1014	G & D Motor & Machine	608	N D St		Grangeville	ID	83530-1134	208-983-2400	7538C	7538U	3599A	
1015	G & F Prototype Plaster Inc	33670	Riviera Dr		Fraser	MI	48026-1621	810-296-2750	3364			
1016	G & G Machine Shop Inc	1580	E Grove Ave		Rantoul	IL	61866-2736	217-892-9696	7538C			
1017	G & G Make All Inc	780	Old Colony Rd		Meriden	CT	06451-7930	203-238-2664	3599A	1791D	5941H	5941
1018	G & H Diversified Manufacturing Inc	11660	Brittmoore Park Dr		Houston	TX	77041-6917	713-849-2111	3699C	3469		
1019	G & L Tool Corp	257	Garden St		Feeding Hills	MA	01030-2507	413-786-2535	3599A			
1020	G & M Precision Machining	9785	Wildcat Rd		Tipp City	OH	45371-9421	513-667-1443	3544B	3599A		
1021	G & M Tool Co Inc	1250	W Dorothy Ln		Dayton	OH	45409-1317	513-293-6687	3541	3544D		
1022	G & P Godwin Co				San Diego	CA	92115	619-287-0159	3599A			
1023	G E S Grinding	844	W 14 Mile Rd		Clawson	MI	48017-1404	810-288-0517	3599D			
1024	G M C Enterprises	6108	Yaqui Way		El Paso	TX	79925-1830	915-774-9889	3599A			
1025	G P Machine	226	Wachtel Ave		Saint Louis	MO	63125-1230	314-631-7243	3599A			
1026	G Q Machine Inc	763	Waverley St		Framingham	MA	01701-8567	508-620-6211	3599A			
1027	G S Mold	3991	Weld County Rd	18	Longmont	CO	80502	303-772-1075	3544E			
1028	Gajeske Inc	6903	Long Point Rd		Houston	TX	77055-2211	713-688-2728	3498	5051Z	3494	
1029	Galgon Industries Inc	37399	Centralmont Pl		Fremont	CA	94536-6549	510-792-8211	3544D	1791D	3469	
1030	Galifco Oregon	650	Powers St		Eugene	OR	97402-5337	503-485-5133	3536	3599A	3535	5012A
1031	Gallatin Machine Works	6343	Jackrabbit Ln		Belgrade	MT	59714-8914	406-388-4160	3599A	7692D		
1032	Galo Welding Service	13150	Nw 32nd Av Op-Lka		Opa Locka	FL	33054	305-769-1341	3599A	7692D		
1033	Galow Metal Products Inc	2685	Universal St		Oshkosh	WI	54904-8939	414-236-1280	3469			
1034	Gambal Manufacturing		Rr722 Oak		Old Forge	PA	18518	717-457-8903	3599A			
1035	Ganton Technology Inc	1250	W Madison St		Pulaski	TN	38478-2640	615-363-8339	3363			
1036	Garbarino Paul P Machine & Iro	34	S Autumn St		San Jose	CA	95110-2597	408-295-0248	3599A			
1037	Gardner Disc Grinders & Abrasives	1918	Creekside Dr		Grand Island	NY	14072-2610	716-773-6222	3291A			
1038	Gardners Mashine Shop	2500	E Tulare Ave		Tulare	CA	93274-3230	209-686-7575	3599A			
1039	Gardners Seamless Guttering		Rr	4	Lebanon	MO	65536-9804	417-588-1619	3089			
1040	Garner Industries	4200	N 48th St		Lincoln	NE	68504-1498	402-434-9100	3599A	3544E	3544D	
1041	Garry Wholfes Drilling		Main		Wevertown	NY	12886	518-251-2212	3541C	1781		
1042	Gates Rubber Co	6575	West Loop S		Bellaire	TX	77401-3521	713-668-3403	3494			
1043	Gazecki John E Precision Machine Works Inc	2024	Puyallup Ave		Tacoma	WA	98421-2619	206-272-5119	3599A			

1044	G[illegible]ool & Machine Corp	14893	Ne 20th Ave		Miami	FL	33181-1150	305-944-2832	3544D			
1045	C[illegible]her Operations Ge Apparatus	130	E 1100 N		Bountiful	UT	84010-4518	801-292-4411	7694	3		
1046	Ge[illegible]ch & Joint Inc	124	E Brdwy		Lubbock	TX	79403	806-763-5329	7539A	37[illegible]	3714B	5013
1047	Gear Systems Inc	23400	W Apollo Ct		Lake Villa	IL	60046-9698	708-356-1606	3599A			
1048	Gear Train Enterpriese	2341	W Sherman St		Phoenix	AZ	85009-5812	602-258-6772	3714			
1049	Gem Grinding Co	132	Dale St		West Babylon	NY	11704-1123	516-249-7780	3541H			
1050	Gem Tool Company Inc	8608	Xylon Ave N		Minneapolis	MN	55445-1821	612-424-5254	3544E			
1051	Gemini Plastic Services Inc	2240	Sw 71st Ter		Davie	FL	33317-7136	305-473-9053	3544E			
1052	Genco A J Machine Co & Drive Shaft Repair	207	Winsor St		Jamestown	NY	14701-3833	716-664-4925	3714B			
1053	Genco Screw Machine Products	6100	Huddleston St		Fort Worth	TX	76137-2219	817-281-7798	3599A			
1054	General Die Casters Inc	6212	Akron Peninsula Rd		Peninsula	OH	44264-9518	216-657-2300	3363			
1055	General Machine & Fabrication Mach Shop	4344	S Church St		Rocky Mount	NC	27803-5711	919-446-3888	3599A			
1056	General Machine Services Inc	500	E Front St		Wilmington	DE	19801-5028	302-427-2055	3599A			
1057	General Molds Inc	400	Oser Ave		Smithtown	NY	11788-3600	516-273-4011	3089			
1058	Generic Environmental Products		Po Box	2113	Kailua Kona	HI	96745-2113	808-325-5955	3443A	7699H	1711K	5082D
1059	Genito Machine & Tool Co	598	Jersey Ave		New Brunswick	NJ	08901-3502	908-846-2811	3599A			
1060	Gentzler Tool & Die Co	3903	Massillon Rd		Uniontown	OH	44685-8727	216-896-1941	3599A	3469	3544D	
1061	Genuine Parts Machine Shop	206	Steele St		High Point	NC	27260-5153	910-885-4289	7538C			
1062	Geo-Log Inc	220	Industrial Ave		Granbury	TX	76049-7810	817-326-5321	3599A	1381		
1063	Geo-Science Engineering Company Inc		Rt502		Moosic	PA	18507	717-346-6333	3541C	8711G	8734	
1064	Geometric Machine & Design	3	Greek Ln		Edison	NJ	08817-2508	908-287-2303	3599F			
1065	George Industries Inc	1	S Page Ave		Endicott	NY	13760-4695	607-748-3371	3365	3599A		
1066	Georgetown Vacuum Forming Co				Georgetown	TX	78627	512-863-5156	3089			
1067	Geotechnical Services Inc	2922	7th Ave S		Birmingham	AL	35233-2904	205-326-0670	3541C	8711D	8711G	8734
1068	Gerald Rutch & Assocates	1243	Olympus Ave		Hacienda Heights	CA	91745-2224	818-333-9144	3365			
1069	Gerhardts Inc	2001	Palma Dr		Ventura	CA	93003-5723	805-658-2877	9199	3569		
1070	Gerod Machine Shop	521	Gordon Ave		Scranton	PA	18508-2519	717-342-9986	3599A			
1071	Getchell & Son Inc		Douglas Pke		Smithfield	RI	02828	401-231-3850	3444			
1072	Gettemeyer Engineering Co	3354	Mid Rivers Mall Dr		Saint Peters	MO	63376-2836	314-397-3388	3599A			
1073	Ghent Machine Svc	1508	Fairview Ave E		Seattle	WA	98102-3719	206-323-0425	7538C	5013	7538U	3599A
1074	Gil-Ross Inc	63	Dixie Hwy		Toledo	OH	43600	419-666-4430	3599A	1541D	4222B	5084E
1075	Gilbert Del R & Son Block Co Inc		Pine Hill Ind Pk		Hooksett	NH	03106	603-669-9258	3251	3271	3498	1711K
1076	Gilco Machine & Welding	608	Railroad Ave		Birmingham	AL	35217-2934	205-841-1347	3599A	3313		
1077	Gillette Winnelson Co	112	Bundy Ave		Gillette	WY	82716-2902	307-682-5167	3569	5082X	3498	3088
1078	Gilroy Foundry	705	Mccray St		Hollister	CA	95023-4033	408-636-9612	3365			
1079	Givone A C Machinery	23	Columbus Ave		Garfield	NJ	07026-3833	201-772-2648	3544E	3599A		
1080	Glacier Products Corp	5211	N 130 St		Saint Paul	MN	55100	612-429-8741	3559A	3714	3599E	
1081	Glaser Corp	1	Elizabeth St		Middleport	NY	14105-1303	716-735-3600	5734	3599A	3599F	3568
1082	Glen Instrument Co Inc	48	South Ave		Webster	NY	14580-3505	716-265-1480	3369			
1083	Glenns Machine Shop	6771	W Yellowstone Hwy		Casper	WY	82604-1907	307-472-2109	3599A	1629L		
1084	Glenridge Mach Co	4610	Beidler Rd		Willoughby	OH	44094-4603	216-975-1055	3541H	3599A		
1085	Globe Machine Co Inc	25	Hickory Springs Industrial Dr		Holly Springs	GA	30142	404-345-5551	3599A	1761	7692D	
1086	Glr Corp	694	Main St		Westbury	NY	11590-5020	516-333-4660	3544D	3541H		
1087	Gmg Industrial Precision	11501	Rojas Dr		El Paso	TX	79936-6900	915-591-7123	3544D			
1088	Golden State Calibration And Service Co	1781	Capital St		Corona	CA	91720-1770	909-734-5312	3823			
1089	Golden State Grinding & Wire	14004	Anson Ave		Santa Fe Springs	CA	90670-5202	310-802-2066	3541H			
1090	Golden State Mold Co	13615	Saticoy St		Van Nuys	CA	91402-6301	818-785-5658	3544E			
1091	Golden Tool	4109	Clay Ave		Fort Worth	TX	76117-1702	817-577-3012	3544E			
1092	Goodspeed Machine Co	15	Summer Dr		Winchendon	MA	01475-1645	508-297-0296	3599A			
1093	Gotapower Inc	43	Woodbine Ave		Budd Lake	NJ	07828-3146	201-426-0669	3731			
1094	Gourmet Products Inc	15632	Golden Creek Rd		Dallas	TX	75248-4923	214-991-3850	5141A	3089		
1095	Graham Machine Co	2036	N Broad St		Meriden	CT	06450-2412	203-237-6081	3599A			
1096	Grand Kal Lubricants & Coolant	760	36th St Se		Grand Rapids	MI	49548-2344	616-247-0363	2992	3569	2899C	1389
1097	Grand Rapids Design & Engineering Inc	321	Root St		Belding	MI	48809-1561	616-794-0550	3544E	3544D		
1098	Grant Company The Mach Shop	408	Liberty Dr		Easley	SC	29640-3230	803-859-9351	3452	3494	3594A	3599A
1099	Grant Oil Country Tubular Corp	363	N Sam Houston Pky E		Houston	TX	77060-2404	713-931-0040	3498			
1100	Graphic Service Inc	216	S Shelby St		Louisville	KY	40202-1053	502-584-4416	3541H	5084F	7699P	
1101	Grauch Enterprises		Port Matilda Hwy		Philipsburg	PA	16866	814-342-7320	3599A			

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1102	Gr[illegible] Ken		Rr 9 Box	[illegible]98	Claremore	OK	74017-8901	918-341-7214	3599A			
1103	C[illegible]nologies Inc	7775	18-1/2 Mile		Sterling Heights	MI	48310	810-254-5730	3599A			
1104	Gray[illegible] Co	1402	Mount Vernon St		Oshkosh	WI	54901-3038	414-231-7909	3724			
1105	Grayco Precision Inc	204	Versaw Ct		Berthoud	CO	80513	970-532-2688	3599A			
1106	Great Lakes Engineering Co	1515	Abbott Ave		Ann Arbor	MI	48103-4103	313-769-8890	3599A			
1107	Great Lakes Molding Inc	155	Mccollum		Galesburg	MI	49053-9509	616-665-4218	3089			
1108	Great Lakes Performance Whs	13815	Gratiot Ave		Detroit	MI	48205-2805	313-527-7010	3714	5013		
1109	Great Lakes Power Prods	4740	Devitt Dr		West Chester	OH	45069	513-874-4707	5551	3714	5082E	3568
1110	Great Western Pipe & Supply Co	3860	Forest St		Denver	CO	80207-1121	303-320-4440	3498	3494		
1111	Greeneville Mach & Iron Works Inc	600	W Irish St #	475	Greeneville	TN	37743-5204	615-639-4178	3548A			
1112	Greensburg Tool & Supply	230	E Main St		Greensburg	IN	47240-2062	812-663-6756	3452	3569	5072E	
1113	Greenwood Electric Motors	1301	Union Landing Rd		Riverton	NJ	08077-2554	609-829-2911	5063C	3599E		
1114	Gretna Machine Shp	8422	Bascom St		Houston	TX	77080-3602	713-690-7328	3599A			
1115	Griffin Pipe Products Co	29200	Southfield Rd		Southfield	MI	48076-1906	810-424-9500	3498			
1116	Griffin Pipe Products Direct D				Lynchburg	VA	24501	804-845-8021	3498			
1117	Grimmer Otto Precision Machining		Littlefield Rd		Acton	MA	01720	508-263-0771	3599A			
1118	Grindley Manufacturing Inc	1989	Blake Ave		Los Angeles	CA	90039-3897	213-665-5781	3541H	3599A		
1119	Grinell Co Inc	21655	Trolley Industral Dr		Taylor	MI	48180-1823	313-292-3800	3498			
1120	Groeger Special Tooling Inc	2600	Bay Rd		Redwood City	CA	94063-3501	415-367-8665	3544D	3599A		
1121	Groeniger & Company	1600	Lone Palm Ave		Modesto	CA	95351-1578	209-577-3333	3569E	3498	3494	
1122	Grohe Mold Polishing				Upland	CA	91784	909-982-2227	3544E			
1123	Groth Corp	42	Hidden Lake Rd		Marshall	TX	75670-9709	903-938-8188	4932	7699H	3494	
1124	Groundwater Supply Co	29	Legate Hill Rd		Sterling	MA	01564-2311	508-422-3209	3541C			
1125	Group Industrial Service & Sales Inc	36432	Sherwood St		Livonia	MI	48154-1937	313-462-0144	3599E			
1126	Grows Autop & Truck Leasing Co	563	Street Rd		Southampton	PA	18966-3748	215-322-9320	7538B	5531B	7538A	3559M
1127	Gta Machine	117	S 1st St		Sierra Vista	AZ	85635-2517	520-458-8807	7538C	5013	7538U	3599A
1128	Gulf Coast Machine Shop	1150	Southern Minerals Rd		Corpus Christi	TX	78409-1818	512-289-1273	3599A	3441		
1129	Gulf South Equipment Sales	8343	Hooper Rd		Baton Rouge	LA	70811-2818	504-357-3757	3599E			
1130	Gulf State Tool		1248c Viscaya Pky		Fort Myers	FL	33901	941-458-0301	3599A	3544D		
1131	Gundlach T J Machine Company	1	Freedom Dr		Belleville	IL	62223-5104	618-233-7208	3531G			
1132	Guy Speaker Co Inc Tubng Ftngs	14620	Martin Dr		Eden Prairie	MN	55344-2097	612-937-8705	3829	3823	3494	
1133	H & K Machine Serv Inc	1550	Progress West Ln		O Fallon	MO	63366-4120	314-272-8412	3451			
1134	H & L Engineering Corp	19921	12 Mi		Roseville	MI	48066	810-777-4180	3089			
1135	H & P Tool Co Inc	610	S G St		Richmond	IN	47374-6135	317-962-4504	3599A	3541		
1136	H & R Tool & Machine Co	19	W Scates St		Caseyville	IL	62232-1549	618-344-7683	3599A			
1137	H And S Specialty Inc	3345	Mannheim Rd		Franklin Park	IL	60131-1533	708-671-4694	3599A			
1138	H B Tool & Die	813	Aqua Ave		Page	AZ	86040	520-645-3336	3544D	5084M		
1139	H E Tool & Mfg Co Inc	450	S Fellowship Rd		Maple Shade	NJ	08052-1823	609-779-1148	3599A			
1140	H G International Inc	4866	E 22nd St		Tucson	AZ	85711-4904	520-748-7990	5075B	3699	3641	
1141	H Grabell & Sons Inc	2051	Garfield Ave		Los Angeles	CA	90040-1803	213-685-6720	3999C			
1142	H S Q Technology				Lansdale	PA	19446	215-393-7470	3829			
1143	H U I Industrial Supply Co	660	White Plains Rd		Tarrytown	NY	10591-6800	914-332-6129	3494			
1144	H V C Mach Inc	5035	Marietta Ave		Nelsonville	OH	45764	614-753-3713	3599A	3544D		
1145	H-R Products Inc	23146	Ireland Rd		South Bend	IN	46614-4414	219-287-2329	3599A	3451		
1146	Hackett Precision Co	1001	W Kirkland Ave		Nashville	TN	37216-3091	615-227-3136	3599A	3599F	3541	3544D
1147	Halenkamp Pump & Control Service	2570	Nw 4th Ct		Fort Lauderdale	FL	33311-8627	305-792-4180	3599E			
1148	Halgon Corp	226	Calle Pintoresco		San Clemente	CA	92672-7503	714-498-3555	3599A			
1149	Hall Machine	7920	Silverton Ave		San Diego	CA	92126-6310	619-693-3975	3599A			
1150	Hall Machine & Welding Co Inc	102	W Mermod St		Carlsbad	NM	88220-6286	505-887-1143	1541	3599A	5051D	3441
1151	Hall Precision Tool & Die Co	1345	W 12th St		Erie	PA	16501-1520	814-456-0107	3544D			
1152	Haller Plastics	175	Central Ave		Farmingdale	NY	11735-6984	718-895-4097	3089			
1153	Hallisey Plumbing & Heating In	8	Purchase St		Middleboro	MA	02346-3316	508-947-3913	1711A	3599E	4941	
1154	Halprin Supply Co	3804	Broadway Pl		Los Angeles	CA	90037-1484	213-232-3131	3569E			
1155	Hamilton Foundry Division Hamilton Foundry & M				Harrison	OH	45030	513-367-2238	3369			
1156	Hamilton Machine & Mold Inc	4685	Kimber		Hamilton	MI	49419-9799	616-751-5179	3544E	3089		
1157	Hamilton Machine Inc	2715	Central Ave		Lake Station	IN	46405-2201	219-962-3267	7538C	3599A		
1158	Hamilton Well & Pump Co				Indianapolis	IN	46227	317-788-4607	3599E			
1159	Hanamoto Manufacturing Co	16128	Covello St		Van Nuys	CA	91406-2910	818-782-5700	3599A			

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1160	Ha[illegible]ck & Grandson Alumnm Fabrctr				Beaufort	NC	28516	919-728-2416	3365	55[illegible]	3599A	7692D
1161	H[illegible]w Machine Company	17703	Pennsylvania Ave		Cleveland	OH	44137-4306	216-475-0220	3451			
1162	Ha[illegible] Tool Co Inc	415	Cranberry Rd		Farmingdale	NJ	07727-3512	908-919-7300	3544D	3599A		
1163	Hansen Fred L Corp	7159	Thornapple Rv Se		Ada	MI	49301	616-676-1508	3291	5999F	5499A	
1164	Harding Machine Company	40	Rush St		Lexington	TN	38351-2241	901-968-2513	3451			
1165	Hardinge Brothers Inc	441	N 3rd Ave		Des Plaines	IL	60016	708-299-2005	3541			
1166	Hargraves Water Well Drilling & Service		Rr	1	Kaplan	LA	70548-9801	318-643-6538	3599E	5082D	1781	1623
1167	Hariton Machinery Co Inc	19381	Wakenden		Redford	MI	48240-1448	313-255-9378	3599E			
1168	Harper Machinery Corp	100	Clanton Rd		Charlotte	NC	28217-1302	704-527-1511	3599A			
1169	Harrel Bit Service				Cross Plains	TX	76443	817-725-6610	3541C			
1170	Harrell Mfg And Tool Inc		Mcloon Rd		Hazlehurst	GA	31539	912-375-4509	3599A			
1171	Harrington Peerless Hoists Co	3105	Sweetwater Rd		Lawrenceville	GA	30244-2488	770-923-7088	3545	2393	3315	
1172	Harris Brothers Machinery Co	501	30th Ave Se		Minneapolis	MN	55414-3218	612-331-1829	3599E	3535	5084D	5084E
1173	Harris Machine	5717	Byrd Dr		Loveland	CO	80538-8991	970-669-5549	3599A			
1174	Harris R H Co	37925	6th St E		Palmdale	CA	93550-5252	805-947-0122	3599A			
1175	Harris-Kayot Inc	2801	W State Blvd		Fort Wayne	IN	46808-1801	219-432-4555	3599A			
1176	Harrison Macine & Tool Inc	21	Lexington Ave		Ewing	NJ	08618-2301	609-883-0800	3599A			
1177	Harrison Piping Supply Co	38777	Schoolcraft Rd		Livonia	MI	48150-1086	313-464-4400	3498	3494	5084V	
1178	Harrison Supply Co	260	S Milwaukee Ave		Wheeling	IL	60090-5098	708-537-0255	3569	3545	5399B	
1179	Harry Davis Enterprises	874	Millbrook Rd		Middletown	CT	06457-5522	203-346-3409	3544E			
1180	Hartland Tool & Mfg Company	621	W Industrial Dr		Hartland	WI	53029-2321	414-367-8633	3599A			
1181	Hartman Iron Art Inc	107	Bridge St		Sandpoint	ID	83864-1322	208-265-5315	8412	1791D		
1182	Hartville Edm Co	367	Kent Ave Ne		Hartville	OH	44632-9640	216-877-1461	3599K			
1183	Hartzell Manufacturing Turtle Lake Division	300	Industrial Ave		Turtle Lake	WI	54889-9109	715-986-4407	3089			
1184	Harvey John D Company Inc	2310	Edwards St		Houston	TX	77007-4414	713-862-2929	3714			
1185	Harwell & Son		Rr	2	Tecumseh	OK	74873-9802	405-598-6097	3599A			
1186	Has Propellers Inc		Municipal Airport		Lubbock	TX	79403	806-763-5298	4581F	3724		
1187	Haslam Co The	350	N 700 E		Centerville	UT	84014-2028	801-292-7221	3569D			
1188	Hassay-Savage Broach Co Inc	100	Industrial Blvd		Turners Falls	MA	01376-1699	413-863-4352	3541B			
1189	Hastings Equity Grain Bin Mfg Co	120	E 2nd St		Hastings	NE	68901-5215	402-462-2189	3523			
1190	Hawaii Metal Forming Corp	151	Puuhale Rd		Honolulu	HI	96819-2253	808-847-5774	3542			
1191	Hawk Engine & Mach	12126	York Rd		Cleveland	OH	44133-3602	216-582-0900	7538C	5084L	7538U	
1192	Hawker De Havilland Inc		70471/2 Vineland Ave		North Hollywood	CA	91605	818-503-1146	3721			
1193	Hayden & Co	950	N York Rd		Hinsdale	IL	60521-2950	312-242-1022	3829			
1194	Hayden Industries	22615	83d S		Kent	WA	98031	206-395-3244	3599A			
1195	Hayden Laboratories	6015	Manning Rd		Miamisburg	OH	45342-1609	513-866-5908	3541C	8748U	3826	8734
1196	Hayden Machinery Co	171	River St		Thomaston	CT	06787-1745	203-283-6261	5084D	3599E		
1197	Haygood Of Kc	7731	E Front St		Kansas City	MO	64120-2305	816-483-3010	3714B	5013	3568	5531B
1198	Hayward Industrial Products In	3502	Brockwood Ct		Richmond	VA	23294-8735	804-527-1683	3494			
1199	Headlee R M Inc	6493	Ridings Rd		Syracuse	NY	13206-1113	315-437-3379	3446F	3494		
1200	Heavern Machinery Inc	1428	Franklin St		Columbus	IN	47201-5716	812-372-7533	3541			
1201	Heidtman Steel	6400	Beckley St		Baltimore	MD	21224-6501	410-633-3033	3542			
1202	Heights Inc	18821	E Valley Hwy		Kent	WA	98032-1219	206-251-8263	7699S	7538B	3699D	
1203	Heli-Die Inc	1339	Greenwood Ave		Deerfield	IL	60015-2709	708-948-1178	3315			
1204	Helix Of Red Hill	4	& Adams		Red Hill	PA	18073	215-679-7924	3599A			
1205	Helro Corp	17801	Helro Dr		Fraser	MI	48026-3818	810-294-9700	3291A	3599F		
1206	Henri Dovsek Co	24376	La Hermosa Ave		Laguna Niguel	CA	92677-2177	714-495-7813	3599A			
1207	Herbs Tool Grind & Sales I	11033	Timberlake Rd		Lynchburg	VA	24502-3939	804-525-1498	3545			
1208	Heritage Northwest Machine	3526	Brooks Ave Ne		Salem	OR	97303-4118	503-364-5743	3599A	7699D		
1209	Heritage Systems	2306	Port Sheldon Rd		Hudsonville	MI	49426	616-669-5590	3399			
1210	Hernandez A Machine Shop & Pro	1919	Noble St		Houston	TX	77026-6740	713-236-8910	3599A			
1211	Herold Partco Mfg Inc	5310	W 161st St		Cleveland	OH	44142-1610	216-267-8600	3569			
1212	Hester Double Disc Grinding	1003	E Vine St		Lodi	CA	95240-3153	209-339-1204	3541H			
1213	Hetager L G Drilling Inc		Rd	1	Punxsutawney	PA	15767	814-938-7370	3541C			
1214	Heyward Services Inc	717	East Blvd		Charlotte	NC	28203-5148	704-372-5805	5099C	3531A	5082D	
1215	Hi-Desert Drive Line Service	11920	Mariposa Rd		Hesperia	CA	92345-1638	619-949-7614	7539	3714	3714B	7538A
1216	Hi-Tech Fabrication & Repair	300	Bell Ave		Findlay	OH	45840-4278	419-423-0872	3365	3441	7692D	
1217	Hi-Tech Fire Equipment Co				Quitman	TX	75783	903-878-2471	3999	3569E		

1218	Hi-Tech Machining	572	S Williams Rd		Palm Springs	CA	92264-1551	619-323-4646	7538C	3599A		
1219	H[illegible] Drilling Inc				Summit Point	WV	25446	304-725-1644	3541C	3[illegible]	1781	
1220	H[illegible]ty Machine Shop	2575	Walsh Rd		San Antonio	TX	78224-3042	210-628-1728	3599A			
1221	High Tech Machine & Tool Inc	219	Andover St		Wilmington	MA	01887-1231	508-657-8266	3599A			
1222	Highland Tool Co	980	Emerson St		Rochester	NY	14606-2708	716-254-7420	3599A			
1223	Highpoint Screw Machine Servic Ofc				Greenwood	IN	46142	317-889-0000	3451			
1224	Hilco Inc	812	Dowling St		Houston	TX	77003-3120	713-224-8277	2394	3569	5032F	
1225	Hiller Systems	3710	Lakeside Ct		Mobile	AL	36693-5111	334-661-1275	3569E	3999	5099A	1742D
1226	Hilltop Manufacturing Co	56849	Rice		Hudson	MI	49247	810-437-2530	2399	3599A	3441	
1227	Hiott Aluminum Recycling	4239	Lane Rd		Zephyrhills	FL	33541-3649	813-788-6569	3334	1099A	3355	
1228	Hirschfeld Steel Co	122	W John Carpenter Fwy		Irving	TX	75039-2014	214-541-1166	1791D	3441		
1229	Hitachi Digital Graphics Usa Inc	114	Carnegie Dr		Oak Ridge	TN	37830-7731	615-483-1961	3541			
1230	Hittle Machine And Tool Co	2122	Dr Martin Luther King St		Indianapolis	IN	46202-1158	317-926-4594	3599A	3541	3544D	
1231	Hms Inc	9909	Wallisville Rd		Houston	TX	77013-4613	713-675-7400	3463	3053	3599E	3594A
1232	Hobbs Inc	2009	13th Ave		Grand Forks	ND	58201	701-772-5579	8721	5084G	3599E	1799S
1233	Hockersmith Jeffrey A				Santa Fe	NM	87501	505-982-9566	1799V	9651	8711M	3823
1234	Hoco Engineering Inc	7634	Central Industrial Dr		West Palm Beach	FL	33404-3496	407-845-2142	3599A			
1235	Hoeck Metal Fabricators	1184	Harrison St		San Francisco	CA	94103-4524	415-621-4883	3699	1791D	3399	3441
1236	Hoffmann Otto U & Sons	3	& Cayuga		Philadelphia	PA	19092	215-457-3800	3541H	3599A	3441	
1237	Holder Machine & Mfg Inc	3945	Chesapeake Dr		Charlotte	NC	28216-3403	704-399-4934	3599A	3441		
1238	Holes Inc				Virginia Beach	VA	23450	804-455-6999	5032C	3541C		
1239	Hollis Machine Service	4604	Nw 8th Ln		Oakland Park	FL	33309-3975	305-771-6250	3599A			
1240	Holly Sales & Service	5443	W Crenshaw St		Tampa	FL	33634-3095	813-884-1968	3599	3556	2011	5046B
1241	Holt L E Grinding Service		Maple St		Rillton	PA	15678	412-446-0977	3541H			
1242	Holt Tool & Die Co Of Calif	2909	Middlefield Rd		Redwood City	CA	94063-3328	415-364-2547	3599A	3469	3544D	
1243	Holtgriveve & Co Steel	2900	S Brentwood Blvd		Webster Groves	MO	63119	314-961-4959	3321			
1244	Holton Tool & Design	7121	Arlington Ave		Riverside	CA	92503-1523	909-785-5473	3544E			
1245	Honeywell Inc	1300	Executive Center Dr		Tallahassee	FL	32301-5025	904-656-9579	3829			
1246	Houston Precision Machine Work	7103	Hemlock St		Houston	TX	77087-1740	713-923-7441	3599A			
1247	Howard & Sons Inc		N Of Clovis		Clovis	NM	88102	505-762-0192	4971	5084G	3599E	5082H
1248	Hsm Machine Works Inc	367	Horseblock Rd		Medford	NY	11763	516-924-6600	3599A			
1249	Huels Auto Machine Shop		916-1/2 N 1st Ave		Durant	OK	74701	405-920-0111	7538	3599A		
1250	Huff Equipment Manufacturers	121	Pine Hill Rd		Spencerport	NY	14559-1034	716-352-1551	9511	1795	3569	4213
1251	Huffman Equipment And Service	320	S Beach St		Fort Worth	TX	76105-1199	817-654-0014	3599E			
1252	Hughes Steel Fabrication	5443	San Fernando Rd		Glendale	CA	91203	818-242-1042	3399	3441		
1253	Hughes-Bechtol Unlimited	6060	Milo Rd		Dayton	OH	45414-3418	513-898-7100	1541	3599A		
1254	Hugo Kramm & Sons Inc	150	Broadway		Albany	NY	12204-2719	518-463-4325	3444			
1255	Hulse Engineering & Mfg	718	N Loren Ave		Azusa	CA	91702-2243	818-812-0122	3599A			
1256	Hunter Industries	30835	Groesbeck Hwy		Roseville	MI	48066-1510	810-776-5048	3544D			
1257	Hunter Tool Sales	1920	Freedom Dr		Charlotte	NC	28208-5251	704-334-9791	7699P	3545	5072E	
1258	Hurst Boiler Sales & Service		S Hwy	319	Coolidge	GA	31738	912-346-3178	3443			
1259	Hutchinson Machine Works	316	N Clarendon Ave		Scottdale	GA	30079-1323	404-292-3392	3599A			
1260	Huth Aluminum Foundry Inc	2187	Highway	101	Shakopee	MN	55379-1754	612-445-3272	3369			
1261	Hy-Pac Hydraulics Inc	1541	Owen Ave		Racine	WI	53403-2144	414-637-6086	3599A			
1262	Hydradyne Hydraulics	336	Industrial Pky		Lafayette	LA	70508-3387	318-232-4129	3678	3494	3594A	5551
1263	Hydraulic Service Co Inc	3315	Chelton Loop N		Colorado Springs	CO	80909-6419	719-591-1922	3494	3599E	3594A	
1264	Hydraulics Supply Corp		Constantine Rd		Savannah	GA	31401	912-233-6791	3599E	1781		
1265	Hydro Conduit Corporation Ship		I 35 W & Hwy	114	Roanoke	TX	76262	817-430-4868	3498			
1266	Hydrotech Corp Envrmntl Servs	1106	Meridian St		Anderson	IN	46016-2776	317-642-1581	8711M	9512	3823	
1267	Hyland Machine & Tool Llc		Commerce Cir		Durham	CT	06422	203-349-2202	3599A	3559		
1268	I & M Machine & Fabrication Inc	401	S 4th St		Saint Joseph	MO	64501-2113	816-233-6841	3494	3599E	3599A	3599F
1269	I B C Precision Inc	1139	Centre Rd		Auburn Hills	MI	48326-2603	810-373-8202	3599A			
1270	I C E Industrial Combustion	336	Malletts Bay Ave		Colchester	VT	05446-1467	802-860-1024	3569			
1271	I C M Of Oklahoma City	643	Se 4th St		Oklahoma City	OK	73129-4007	405-235-2609	3699C	5039	3829C	
1272	I X L Machine Shop		Corner Of 7th & Pine		Holland	MI	49422	616-392-9803	7349C	3599A	5051D	3441
1273	Icenhower Max Rev		Hwy 59 S		Texarkana	TX	75501	903-832-4258	5999O	5511B	3599E	
1274	Ict Inc	1330	Industrial Dr		Shelby	MI	49455-9584	616-861-5348	5944B	3599A		
1275	Idaho Falls Foundry & Machine	501	Northgate Mile		Idaho Falls	ID	83401-2531	208-522-7412	3523	7699	3369	3599A

1276	Id[illegible] Thread & Gage Inc	17124	S Western Ave		Gardena	CA	90247-5224	310-324-0585	3599A			
1277	I[illegible]ump Inc				Placerville	CA	95643	916-622-5762	5084G	3[illegible]	1711F	7299O
1278	Impac[illegible]ase Co		Po Box	[illegible]912	Spokane	WA	99209-0912	509-467-3303	3499	874[illegible]		
1279	Impact Precision Screw Product	10	Delancey St		Newark	NJ	07105-1509	201-344-3120	3451			
1280	Imperial Casting Co	62	Spruce St		Providence	RI	02903-1557	401-521-6626	3363			
1281	Imperial Spring Co Inc	339	Clark St Ext		Southington	CT	06489	203-628-9611	3495			
1282	Imperial Stamping Corp Ofc	23852	Reedy Dr		Elkhart	IN	46514-8311	219-262-2641	3469			
1283	In Tolerance	129	29 St Dr Se		Cedar Rapids	IA	52403	319-363-8561	3599A			
1284	Indarg Engineering	12521	Crenshaw Blvd		Hawthorne	CA	90250-3302	310-679-6022	3599A			
1285	Independent Concrete Pipe Co Of Mo	12950	Gravois Rd		Saint Louis	MO	63127-1715	314-842-2900	3498			
1286	Independent Pneumatic Control	448	Gem		Meridian	ID	83642	208-888-2828	3829			
1287	Independent Tooling Co		Liberty Greene		Waynesburg	PA	15370	412-627-3596	3541H			
1288	Industrial Art Metal Spinni	4801	Chaincraft Rd		Cleveland	OH	44125-1888	216-587-5666	1791D			
1289	Industrial Cable & Sling Co	5740	Federal St		Detroit	MI	48209-1291	313-554-0313	3545	3315		
1290	Industrial Electric Sales & Service South	1000	Nw 1st Ave		Boca Raton	FL	33432-2601	407-395-5510	5063C	3599E		
1291	Industrial Engineering Inc	4430	Tielker Rd		Fort Wayne	IN	46809-1500	219-478-1514	3599K	3544B	3599A	3599F
1292	Industrial Fluro-Plastic	9468	S 560 W Sandy		Sandy	UT	84070-2510	801-566-7118	3479	3089	5085H	
1293	Industrial Gases Corp-Div Stevenson Zimmer	4301	Arco Ln		Charleston	SC	29418-5923	803-554-6261	4932	5999T	3548B	7692
1294	Industrial Gauges & Precision Machining		16w107 83rd St		Hinsdale	IL	60521-5824	708-850-9077	3599A			
1295	Industrial Grinding Co Inc	141	Glendale Ave		Woonsocket	RI	02895-6098	401-766-2238	3541H			
1296	Industrial Heating Systems Inc	1409	Boyd St		Chattanooga	TN	37412-2816	615-622-0360	3829			
1297	Industrial Hose Supply Marwedel	377	Shaw Rd		South San Francisco	CA	94080-6607	415-952-0767	3494	5085H		
1298	Industrial Instrumentation Ser	1400	Rahway Ave		Avenel	NJ	07001-2214	908-815-9090	3829			
1299	Industrial Machine	2501	16th St Ne		Black Eagle	MT	59414-1045	406-454-1617	7538C	5083	3599A	
1300	Industrial Machine	2808	Sammys Ln		Florence	SC	29506-3841	803-667-4582	3599A	3441	7692D	
1301	Industrial Machine & Repairs		118th Street		Lubbock	TX	79423	806-745-5849	3599A			
1302	Industrial Machinery & Accessories	6381	Western Ave		Buena Park	CA	90621-2832	310-521-6289	3599			
1303	Industrial Machining Co	1257	Columbia Ave		Riverside	CA	92507-2124	909-781-8754	3599A			
1304	Industrial Machining Services Inc	2734	84th Ave		Zeeland	MI	49464-9594	616-772-2138	3599A			
1305	Industrial Machry Mart & Trading Center	560	Dublin Ave		Columbus	OH	43215-2388	614-464-4376	3541	5084D	3599E	
1306	Industrial Maintenance Equipment	602	Kress St		Houston	TX	77020-4910	713-675-1258	3599E	5531B	7538A	
1307	Industrial Metal Flame Sprayers Inc	419	Salem St		Durham	NC	27703-4255	919-596-9381	3599A	3599E	3599F	7692D
1308	Industrial Metal Supply Co	3303	N San Fernando Blvd		Burbank	CA	91504-2550	213-849-3184	5051B	5051A	3364A	3498
1309	Industrial Metalworks	2501	Tremont Rd		Savannah	GA	31405-1540	912-233-3703	3365	1791D	1623B	1761
1310	Industrial Piping Supply Inc	1909	15 Av W		Virginia	MN	55792	218-749-4444	3498			
1311	Industrial Roofing Coompany In	31	W Hylda Ave		Youngstown	OH	44507-1606	216-782-8197	1761B	3444	1761	
1312	Industrial Rubber Machry Inc	503	Portage Lakes Dr		Akron	OH	44319-2269	216-645-0020	3599E			
1313	Industrial Screen & Maintenance Inc	750	E F St		Casper	WY	82601-1467	307-234-3547	3536	1731	3599E	3599A
1314	Industrial Sheet Metal Product	4251	Hunter St		Long Island City	NY	11101-4180	718-784-2750	2842	1761	3443C	1711B
1315	Industrial Steel Fabrication	12212	Missouri Bottom Rd		Hazelwood	MO	63042-2318	314-895-1447	1791D			
1316	Industrial Tool & Die	5531	Mitchelldale St		Houston	TX	77092-7217	713-688-0880	3599A	3469	3544D	
1317	Industrial Tooling Service	1090	2		Denver	CO	80202	303-825-0056	3089			
1318	Industrial Ventilation Inc	1760	U S Hwy	30	Heyburn	ID	83336	208-678-7788	3829	0134	5075R	
1319	Industrl Instrumentation Svce	4113	4th Ave		Brooklyn	NY	11232-3597	718-854-7115	3829			
1320	Ingalls Iron Works Co The		Rivera Beach		Pasadena	MD	21122	410-437-4987	3548A			
1321	Ingalls Power Products Installation	1027	Folger Ave		Berkeley	CA	94710-2819	510-204-9017	3699			
1322	Ingram Equip Co Pumps	1748	E Caldwell Ave		Visalia	CA	93292-9214	209-734-3362	3523	5084G	3599E	
1323	Ingram Slotting & Machine	32727	8 Mile Rd		Livonia	MI	48152-1338	810-478-2430	3541B			
1324	Inland Fastener Inc	770	W Hawthorne Ln		West Chicago	IL	60185-1968	708-293-3800	3452			
1325	Inland Steel Company Inland Steel Flat Froduc	4400	Railroad Ave		East Chicago	IN	46312-2609	219-399-5506	3312			
1326	Innovative Control Services	24	1st St		Battle Creek	MI	49017-4920	616-963-4930	3829	3599E	3599F	
1327	Innovative Control Source Inc	1113	Mearns Rd		Warminster	PA	18974-2215	215-672-4693	3829			
1328	Innovative E D M Inc	14040	Hovey Ave		Warren	MI	48089-5915	810-777-8270	3599K			
1329	Inovent Engineering	28815	Aurora Rd		Cleveland	OH	44139-1838	216-248-7716	8741G	3599F		
1330	Insco	1413	W Barbours Cut Blvd		La Porte	TX	77571-3160	713-471-9223	5084V	5063N	3498	3494
1331	Instrument Control Service	908	Lakeside Dr		Mobile	AL	36693-5154	334-666-1785	3829			
1332	Instrument Products Inc	7114	Bellfort St		Houston	TX	77087-5908	713-643-5731	3599A			
1333	Instrument Specialties Inc	1886	Larchwood Dr		Troy	MI	48083-2225	810-689-0176	7629E	5063N	3829	3823

1334	Inst[illegible]mentation Marketing Corp	820	S Mariposa Ave		Los Angeles	CA	90005-2125	213-849-6251	3825	781[illegible]	[illegible]043E	5043
1335	Ins[illegible]ins	530	W Chicago Ave		Palos Park	IL	60464	708-923-3000	3469			
1336	Integ[illegible] Controls & Equipment				Woodland Hills	CA	91364	818-346-5873	3829			
1337	Intercont Products	2600	N Westgate Ave		Springfield	MO	65803-9503	417-869-9549	3599F			
1338	Interflex Inc	1574	N County Road	25a	Troy	OH	45373-1317	513-335-7990	3541H			
1339	Intermet Corp	2859	Paces Ferry Rd Nw		Atlanta	GA	30339-5701	770-431-6000	3369			
1340	International Cast Products Inc	85	Kinnelon Rd		Butler	NJ	07405-2398	201-838-1213	3369			
1341	International Machine Service Inc	19	Phillips Rd		Poquoson	VA	23662-1135	804-868-8487	3599E			
1342	International Precision Tools Inc	456	Industrial Blvd		Mc Donough	GA	30253-6607	770-957-3312	3545			
1343	International Stainless Steel Co	7966	Arjons Dr		San Diego	CA	92126-6361	619-549-0173	3312			
1344	Interstate Iron Works	283	King George Rd		Millington	NJ	07946	908-903-1049	3548A			
1345	Intertool Precision Machining	16950	Ponderosa Ln		Riverside	CA	92504-6230	909-789-9635	3599A			
1346	Iowa Machinery & Supply Co Inc	16	River Rd		Waterloo	IA	50701-1344	319-235-7035	3563	3536	3594A	3569
1347	Iowa Rivet Tool Co Inc				Alburnett	IA	52202	319-842-2216	3599A			
1348	Irby Machine & Welding		Farmers Bridge Rd		Hephzibah	GA	30815	706-592-6123	3599A	7692D		
1349	Iron Horse Machine		S Of		Watford City	ND	58854	701-842-6895	3599A			
1350	Ironmaster Division	1102	Windham Rd		South Windham	CT	06266-1131	203-423-4575	3599A			
1351	Iroquois Foundry Co Sales Ofc	2314	N Grandview Blvd		Waukesha	WI	53188-1675	414-542-3885	3369			
1352	Iseli Company		Greystone Rd		Waterbury	CT	06701	203-757-9281	3599A	3451		
1353	Ishmael Precision Tool & Die	55	Marybill Dr		Troy	OH	45373-1033	513-335-8070	3544D			
1354	Isu Inc	3902	Rivers Ave		North Charleston	SC	29405-7043	803-554-9450	1791D			
1355	Itex Control Company	11513	Sigel Rd		Germantown	OH	45327-9759	513-855-3446	1731	3829		
1356	J & B Tool Co		Craig Rd		Saegertown	PA	16433	814-333-1285	3544			
1357	J & D Machine Inc		4910-R N Peoria		Tulsa	OK	74126	918-425-5704	3599A			
1358	J & F Commercial Products		Whitehorse Rd & Second Ave		Phoenixville	PA	19460	610-983-0169	3089	5021C		
1359	J & F Machine	10631	Bloomfld		Los Alamitos	CA	90720	310-430-1171	3599A			
1360	J & F Machine Works Inc	254	2nd		Elizabeth	NJ	07206	908-289-4070	3599A	3599F		
1361	J & H Machine Co	2815	Harway Ave		Brooklyn	NY	11214-6919	718-714-5159	3599E			
1362	J & J Machinery		Old Rt	460	Kellysville	WV	24732	304-898-2040	3599A			
1363	J & L Machine Co		Boynton Dr		Rossville	GA	30741	706-866-7468	3599A			
1364	J & L Machine Shop		Moss & Hwy	31	Brownsboro	TX	75756	903-852-7117	7538C			
1365	J & L Specialty Products Corporation Office	1500	W Main St		Louisville	OH	44641-2325	216-875-6200	3312			
1366	J & L Tool Co Inc	368	N Cherry Street Ext		Wallingford	CT	06492-2309	203-265-6237	3544E	3089		
1367	J & M Foil Stamping	4960	Sw 52nd St		Davie	FL	33314-5530	305-797-0036	3999L			
1368	J & M Mach Inc	1234	High St		Painesville	OH	44077-5559	216-357-1234	3599A			
1369	J & R Engineering Inc	271	Leonard St		Raynham	MA	02767-1128	508-823-9566	3599E			
1370	J & R Machining	6280	San Ignacio Ave		San Jose	CA	95119-1365	408-365-7314	3599A			
1371	J & R Manufacturing Serv & Sales	4920	E Washington Blvd		Los Angeles	CA	90040-1142	213-268-3391	2899	3291	7542	4213
1372	J & T Bit & Supply Inc				Quitman	TX	75783	903-967-2258	3541C			
1373	J & W Fabricating	8373	Highway	79	Pinson	AL	35126-2685	205-681-3089	3365	1791D	3441	
1374	J A D Custom Machining	17400	Judson Rd		San Antonio	TX	78247-4629	210-655-1358	3599A			
1375	J And H Manufacturing Co	82	Denver Ave		Bridgeport	CT	06605-1901	203-367-4551	3599A			
1376	J B Industries	133	La France Ave		Bloomfield	NJ	07003-5683	201-429-4824	3599F			
1377	J B Mach Co Inc	1450	E 357th St		Willoughby	OH	44095-4126	216-946-8161	3599A			
1378	J B Mold Polishing		1719-21st Sm		Santa Monica	CA	90404	310-453-3761	3544E			
1379	J B Tool Co	33	Eldridge St		Mount Clemens	MI	48043	810-463-5780	3544E			
1380	J C B Precision Tool & Mold	1600	W Evans Ave		Englewood	CO	80110-1032	303-922-9345	3544E	3089		
1381	J C Industries	2095	W 2200 S		Salt Lake City	UT	84119-1323	801-974-9120	3599A			
1382	J C Machine Co Inc	12497	Mccoys Forl Rd		Walton	KY	41094	606-485-1216	3599A			
1383	J C Machine Inc	1535	Northrock Ct		Rockford	IL	61103-1233	815-877-6079	3599A			
1384	J D Franz Research	1804	Tribute Rd		Sacramento	CA	95815-4313	916-646-5595	3829C			
1385	J E Victor Inc	525	Portage Trail Ext		Cuyahoga Falls	OH	44223-2541	216-923-5557	3291	5087E		
1386	J K Machinery				Mc Henry	IL	60050	815-344-2953	3599D			
1387	J M C Instruments Inc				Casper	WY	82601	307-234-7979	3829	5084V	3823	3498
1388	J M C Tool & Mfg Co Inc	845	Fairfield Ave		Kenilworth	NJ	07033-2013	908-241-8950	3599A	3541		
1389	J M Engineering	1919	Leafdale Ave		El Monte	CA	91733-3600	818-444-2980	3599A			
1390	J S Peters Machry Sales Inc	3201	E Royalton Rd		Cleveland	OH	44147-2803	216-546-1077	3599E			
1391	J W Hall Enterprises	17731	Elizabeth Snfe		Dickinson	TX	77539	713-337-6311	3599A			

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[redacted]92	J W[illegible]ustries Inc	601	Paragon Rd Se		Albuquerque	NM	87105-7473	505-873-1784	3599A			
1393	J-[illegible]ne	3816	S Taft Hill Rd		Fort Collins	CO	80526-2960	970-225-6374	3599A			
1394	Jab[illegible]s Inc	2105	Santa Cleotilde Ave		Laredo	TX	78040-3044	210-724-9822	3569	509[illegible]	[illegible]089	
1395	Jabonetas Machining	1495	Rollins Rd		Burlingame	CA	94010-2316	415-344-8942	3599A	3544D		
1396	Jacks Machine Works	660	Canary St		Vidor	TX	77662-9425	409-769-5203	3566	3599A	3544D	
1397	Jacksons Machine & Engine Parts	1205	S Jackson Hwy		Sheffield	AL	35660-5748	205-381-5548	7538C	5531		
1398	Jaco Manufacturing Co	468	Geiger St		Berea	OH	44017-1319	216-234-4000	3089			
1399	Jaco Tool Co	3910	10th Ave N		Birmingham	AL	35234-2415	205-591-8665	5111	7699P	3544D	7699D
1400	Jakolat Machine Co	31	S 42nd Pl		Phoenix	AZ	85034-3013	602-273-0335	3599A			
1401	James Mcgraw Inc	478	Musket Dr		Winchester	VA	22602-9350	540-869-6612	3569			
1402	James Spring & Wire Co	6	N Bacton Hill Rd		Frazer	PA	19355-1035	610-644-3450	3399			
1403	James Walker Company	1	Beach Rd		Key Largo	FL	33037-4334	305-451-4569	3569			
1404	Janer Machining Inc	28	Raynor Ave		Ronkonkoma	NY	11779-6600	516-471-3466	3599A			
1405	Janll Engineering Company	1247	S Buena Vista St		San Jacinto	CA	92583-4664	909-654-2796	3599A			
1406	Jaten Associates Inc	1610	Greensburg Pike		North Versailles	PA	15137-1616	412-823-1120	3599A	1761		
1407	Jayco Steel Rule Cuttng Die In	131	Boerum St		Brooklyn	NY	11206-2636	718-387-8180	3999L			
1408	Jct Sheet Metal Inc	1228	Se Industrial Blvd		Port Saint Lucie	FL	34952-3503	407-398-9522	1791D	1761	5065D	
1409	Jd Tool Co	225	Research Dr		Milford	CT	06460-8507	203-874-4114	3599A			
1410	Jeb J Manufacturing		Atlanticav & Somerdalerd		Clementon	NJ	08021	609-784-5561	3724			
1411	Jebco Divison	2614	Martha St		Omaha	NE	68105-3261	402-345-6767	3369	3599A		
1412	Jei Metallurgical	10725	Sandhill Rd		Dallas	TX	75238-1227	214-341-7171	3313			
1413	Jencks Inc/H W		Us	31	Benzonia	MI	49616	616-882-7276	3599			
1414	Jenkins Machine Shop	1137	Swift Ave		Kansas City	MO	64116-4129	816-471-3785	3599A	3313		
1415	Jenkins Precision	54	Cowee Dr		Dayton	NV	89403	702-246-5595	3599A			
1416	Jensen Orla Orlas Machine Sho	581	Division St		Campbell	CA	95008-6905	408-378-1442	3599A			
1417	Jensen Tools Inc Customer Service	7815	S 46th St		Phoenix	AZ	85044-5313	602-968-6231	3545			
1418	Jerguson Gage & Valve Co	3576	Concord Rd		York	PA	17402-8626	717-751-0811	3829	3569	3494	
1419	Jericho Products				San Jose	CA	95118	408-978-3873	3545			
1420	Jerry White Inc	1203	Clinton Dr		Galena Park	TX	77547-3421	713-455-8391	3569J			
1421	Jersey Industrial		State Hwy No	45	Woodstown	NJ	08098	609-769-1107	3494			
1422	Jesco Manufacturing Co	5662	N Northwest Hwy		Chicago	IL	60646-6136	312-763-2900	3469	3399		
1423	Jet Stream Manufacturing		Gulph Creek Business Ctr		Conshohocken	PA	19428	610-941-0122	3599A			
1424	Jetstream Watercutting	20273	Mack St		Hayward	CA	94545-1224	510-786-0800	3541	3063G		
1425	Jim Jeffers Water Well Drillin		M-115 &	M-37	Mesick	MI	49668	616-885-1010	3599E	1781		
1426	Jmt Automation & Control	1220	Kennestone Cir		Marietta	GA	30066-6045	770-429-1963	3829			
1427	Jobar Mfg Co	7225	Division St		Cleveland	OH	44146-5483	216-232-5555	3599A			
1428	Jobsite Fasteners Inc	9595	Distribution Ave		San Diego	CA	92121-2305	619-693-1833	3462	3545		
1429	Jodex Graphel Inc	6115	Centre Park Dr		West Chester	OH	45069-3869	513-779-6166	3599K			
1430	Johns Precision	34	Front St		Indian Orchard	MA	01151-1148	413-543-3666	3599A			
1431	Johnson & Berry Manufacturing Inc	907	Indian Cmtry Rd		L' Anse	MI	49946	906-524-6433	3599A			
1432	Johnson Boiler Co	300	Pine		Grand Haven	MI	49417	616-842-5050	3443			
1433	Johnson Bros Metal Forming Co	5500	Mc Dermott Dr		Bellwood	IL	60104	708-449-7050	3542			
1434	Johnson Controls Inc	19118	S Reyes Ave		Compton	CA	90221-5898	310-637-8800	3829			
1435	Johnson H20 Equipment	4350	Hopewell Ave		Bettendorf	IA	52722-5967	319-332-6820	5084G	3599E	7389X	5082H
1436	Johnson Machine & Tool Inc	402	Space Park N		Goodlettsville	TN	37072-1862	615-859-3749	3541H	3599A	3544D	
1437	Johnson Metal Products		Souther Field Rd		Americus	GA	31709	912-924-3403	3599A	7692D		
1438	Johnson Welton V Engineering Co Inc	52	Commerce St		Springfield	NJ	07081-3004	201-467-8500	3451			
1439	Johnson Yokogawa Inc	1201	W Crosby Rd		Carrollton	TX	75006-6905	214-242-6521	3829	5063E		
1440	Johnston Tool Die & Machine Co Inc	35	Wilcutt Block Rd		Columbus	MS	39701-9618	601-329-2420	3599A	3541	3544D	
1441	Johnstone Supply	335	N Weber Ave		Sioux Falls	SD	57102-0411	605-338-2652	3699			
1442	Jolex Boring Inc	8495	Ronda Dr		Canton	MI	48187-2001	313-459-3080	3599A			
1443	Jordan Plastic Center	1101	13th St		Columbus	GA	31901-2247	706-323-6444	5719B	3089		
1444	Jorich Machine Co Inc		River Rd		Cliffside Park	NJ	07010	201-945-2020	3599A			
1445	Joseph Casting Inc	36	W 47th St		New York	NY	10036-8601	212-704-0968	3363	3364	3599	
1446	Joseph Hill Co Inc The	141	Spencer St		Brooklyn	NY	11205-3930	718-855-2326	3399			
1447	Jpk Enterprises	5000	W Oakey Blvd		Las Vegas	NV	89102-3393	702-870-0216	3999L	3471A	3089	
1448	Jrv Machining Service Co	11723	Washington Blvd		Whittier	CA	90606-2613	310-698-7313	1521E	3599A		
1449	Ju La Precision Machining	1442	Arrow Hwy		Baldwin Park	CA	91706-1342	818-357-6907	3599A			

1450	Ju[illegible] & Die Mfg Inc	247	Fourth Tipp City		Tipp City	OH	45371	513-667-2039	3544D			
1451	Ju[illegible]stries Inc	2011	E 30th St		Erie	PA	16510-2547	814-898-1237	9651	35[illegible]	[illegible]541	3599D
1452	K & A Machine & Tool Co	4821	W Mich		Jackson	MI	49201	517-750-9244	3541H	3599A	7699D	
1453	K & B Molded Products	9360	National Rd		Brookville	OH	45309-9628	513-836-9989	3544E	3089		
1454	K & C Machining Co Inc	138	B Hwy	94	Blairstown	NJ	07825	908-362-8481	3599A			
1455	K & C Supply	1225	E Manhattan Blvd		Toledo	OH	43608-1549	419-726-4563	3498	5023P		
1456	K & K Engineering	5747	W Raymond St		Indianapolis	IN	46241-4344	317-243-9430	3544E	3599A	3089	
1457	K & K Machine Shop	3250	El Camino Real		Atascadero	CA	93422-2501	805-466-6101	7538C			
1458	K & K Machine Shop Inc	6880	Ridge Rd		Douglasville	GA	30134-7135	770-949-2609	3599A			
1459	K & K Services	421	Highway	418	Fountain Inn	SC	29644-9191	803-862-9762	3599A			
1460	K & K Tool & Die Inc	1016	E Grove St		Bloomington	IL	61701-4204	309-829-4479	3599A	3544D		
1461	K & M Industries	20248	19 Mi		Big Rapids	MI	49307	616-796-3533	5032C	3273	3443A	1799C
1462	K & R Repairs	606	Highway	34	Grace	ID	83241-5121	208-425-3119	4971	3599A	5084G	3599E
1463	K & S Water Works Supply		3502-D N 3000 East		Twin Falls	ID	83301	208-733-2693	1541	1794	3498	
1464	K & W Precision Machining	10501	Us Rt	68	Warren	OH	44482	216-675-7217	3599A			
1465	K & Y Screw Machine Corp	12275	Dixie		Redford	MI	48239-2490	313-532-6688	3451			
1466	K A Tool & Supply Inc	2156	O'toole Ave		San Jose	CA	95131	408-577-1510	3599A			
1467	K B J Manufacturing	50	Main Pq		Bristol	CT	06010	203-585-7257	3599A			
1468	K B Metals				Canoga Park	CA	91303	818-888-2223	7389G	3365	3471C	
1469	K Cee Manufacturing Mach Shop	7751	Alabama Ave		Canoga Park	CA	91304-4948	818-716-5716	3451	3599A		
1470	K F Industries Inc	10105	W Gulf Bank Rd		Houston	TX	77040-3121	713-466-6656	1629L	3494		
1471	K G W Corporation		Cherry Hill Area		Cherry Hill	NJ	08002	609-751-3322	7378A	3541	3599D	
1472	K M Industrial Machinery	530	W Kalamazoo Ave		Kalamazoo	MI	49007-3306	616-381-0690	3545	3599K	3541	
1473	K O B Tool & Design Inc		N115 W19301 Edison Dr		Menomonee Falls	WI	53051	414-251-8821	3544E			
1474	K P Precision	9003	130th Av N		Clearwater	FL	34615	813-585-7352	3599A			
1475	K S M Products	400	3rd Ave		Brooklyn	NY	11215-2705	718-596-1700	3469			
1476	Kaiser Products Corporation	3555	N Prospect St		Colorado Springs	CO	80907-5450	719-636-3864	3089			
1477	Kaiser Specialty Inc	8700	Tyler Blvd		Mentor	OH	44060-4350	216-974-9660	3599A	3469		
1478	Kamashian Engineering	9128	E Rose		Bellflower	CA	90706	310-920-9692	3544E	3544D		
1479	Kanis Engineering & Model Shop		83r Beaver St		Waltham	MA	02154-8442	617-899-6601	3599A			
1480	Kankakee Valves	780	E Fair St		Kankakee	IL	60901-2175	815-939-7700	3494			
1481	Kaplan Container Corp	130	Despatch Dr		East Rochester	NY	14445-1448	716-385-1760	3412	3085	3499	5113E
1482	Kaps Machine Works Inc				Anderson	TX	77830	409-873-2813	3599			
1483	Kar Products Inc	471	N 3rd Ave		Amf Ohare	IL	60666	312-694-3277	3569			
1484	Karls Die Cutting	5862	Mettler Ave		Los Angeles	CA	90003-1316	213-233-9668	3999L			
1485	Karma Metal Products	556	Caldwell Ave		Mansfield	OH	44905-1499	419-524-4371	3451			
1486	Kasunick Welding & Fabricating Co	1541	Springgrdn Ave		Pittsburgh	PA	15123	412-321-2715	3599A	7692D		
1487	Kauffman Machine & Welding	218	Main		Trenton	NE	69044	308-334-5301	3599A	7692D		
1488	Keen Company	4710	S C R	1311	Odessa	TX	79760	915-563-9222	3599A	5063N		
1489	Keen Compressed Gas Co/Propane Div Fork L	4061	New Castle Ave		Wilmington	DE	19880	302-594-4545	5947U	4932	3291A	3569
1490	Kehrig Manufacturing Co	28151	Hall		Mount Clemens	MI	48043	810-949-9610	3444	4226		
1491	Kele & Associates	2975	Brother Blvd		Memphis	TN	38133-3909	901-382-4300	3829			
1492	Ken-Air Ine				Corpus Christi	TX	78415	512-851-8229	1711	5075	3398	
1493	Kenai Supply		Spur Hy		Kenai	AK	99611	907-283-7521	5211	5075	5033	3498
1494	Kendo Machine & Fabrication	14	Emily Rd		Broad Brook	CT	06016-9660	203-623-7373	3599A			
1495	Kenmar Plastic	102	S River Dr		Tempe	AZ	85281-3011	602-894-9760	3089			
1496	Kenowa Industries Inc	11399	E Lakewood Blvd		Holland	MI	49422	616-392-7080	3599A	5023P	3441	7692D
1497	Kent Allen Inc	16134	Cohasset St		Van Nuys	CA	91406-2909	818-902-1622	3541			
1498	Kentec Mega Tools Stores	2135	E Main St		Snellville	GA	30278-6425	770-736-1007	3545			
1499	Kentucky Aluminum Co		Cumberland Hts		Burnside	KY	42519	606-561-5035	3334	1099A	3355	
1500	Kentwater Tool & Mfg Co	5516	W River Dr Ne		Comstock Park	MI	49321-8914	616-784-7171	3544D	3544B	3599F	
1501	Kerris Industrial Sales & Service	44020	N Groesbeck Hwy		Clinton Township	MI	48036-1108	810-469-8255	3599D			
1502	Kevco	63	Bartlett St		Plainville	CT	06062-3122	203-747-4135	3599A			
1503	Keyes Thos G Inc	453	Lancstrpke		Paoli	PA	19301	610-644-2886	3541C	3561	7389X	1781
1504	Keystone Sales Inc	802	Navigation Blvd		Corpus Christi	TX	78408-2634	512-884-4123	3829	3494		
1505	Keystone Specialty Machines	1915	Old Covington Rd Ne		Conyers	GA	30208-1521	770-760-8961	3599F			
1506	Kiefer Technical Services	141	Hickory Corner Rd		Milford	NJ	08848-2033	908-479-1800	3599F			
1507	Kiesel Seismic Valve Inc		Po Box	2052	Dublin	CA	94568-0205	510-833-0996	3494			

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1508	Kil[illegible] Co Inc	501	National		Anniston	AL	36201	205-831-3010	3599A			
1509	Ki[illegible]gns Inc	551	Foster City Blvd		Foster City	CA	94404-1632	415-571-8003	3599F			
1510	Kin[illegible] Systems Inc	18	Arboretum Rd		Roslindale	MA	02131-1102	617-522-8700	3699C	3822		
1511	King & Queen Industries		Fm	351	Beeville	TX	78102	512-358-6992	3498			
1512	King Centerless Grinding Co	29800	Stephenson Hwy		Madison Heights	MI	48071-2341	810-542-1615	3541H			
1513	King Richards Jewelry Casting	6737	Ringgold Rd Ridge		Chattanooga	TN	37412	615-894-8382	3363	3364	3599	
1514	King Way Technical Inc	10855	68th St S		Cottage Grove	MN	55016-1522	612-459-9428	3541	3599D	3599E	
1515	Kings Industrial Maintenance	905	Violet St		Burkburnett	TX	76354-3614	817-569-3805	3599A	3599E	1791D	
1516	Kingsford Machine Products		Hillside		Hop Bottom	PA	18824	717-942-6965	3714B			
1517	Kirk Welding & Co	1608	Holmes St		Kansas City	MO	64108-1589	816-221-3030	4923	1311	3548B	7692
1518	Kirklands Pipe & Iron Works		Hwy	78	Williston	SC	29853	803-266-3456	3548A			
1519	Kks Industries Inc	1200	Cleveland St Sw		Massillon	OH	44647-7956	216-837-3666	3999L			
1520	Klock Company	4215	Burns Rd		West Palm Beach	FL	33410-4654	407-622-2200	3548	3398		
1521	Knight Machining Service	899	Moe Dr		Akron	OH	44310-2560	216-630-1348	3599A			
1522	Knight Pump Service				Moultrie	GA	31776	912-985-7157	3599E	1781		
1523	Knight Tool & Die	301	21st St E		Bradenton	FL	34208-1613	941-747-3301	3544B	3544D		
1524	Knott Kustom Fabrications		Rr	2	Urbana	IL	61801-9802	217-469-2784	3599A			
1525	Kobold Instruments Inc				Charlotte	NC	28200	704-362-4800	3829			
1526	Koehl Machine & Tool Works	371	East St		Buffalo	NY	14207-2061	716-875-4672	3599A			
1527	Koffler Manufacturing Inc				New England	ND	58647	701-579-4235	7699C	3599A	7692D	
1528	Kokusai Koki America Inc	297	Kinderkamack Rd		Oradell	NJ	07649-1535	201-262-1565	3545	5084D		
1529	Koldwave Air Conditioners	950	Bolger Ct		Fenton	MO	63026-2029	314-349-1900	3494			
1530	Kragel Company Inc The	23	Lake St		Hamburg	NY	14075-4932	716-648-1344	2394	3569E	5722C	
1531	Kram Precisn Machng Inc	6737	U S Rt	40	New Carlisle	OH	45344	513-845-2244	0272	5941F	3599A	
1532	Kramer Mechanical	1082	E 2nd St		Jamestown	NY	14701-2242	716-664-6355	7538C	3599A		
1533	Krasberg Corp	1365	Lee St		Des Plaines	IL	60018-1514	708-296-9500	3469			
1534	Kraus Machine Inc	131	W Wichita St		Colwich	KS	67030-9782	316-796-1185	3599A			
1535	Krieger Machine Co	3099	Se Monroe St		Stuart	FL	34997-5981	407-287-8400	3599A			
1536	Krimes Automotive	302	Ridge Ave		Ephrata	PA	17522-2556	717-733-0505	7538C			
1537	Kritzar John P Inc	196	Brahma Ave		Bridgewater	NJ	08807-2755	908-725-4232	3541C			
1538	Kronk Forge	6105	John Kronk St		Detroit	MI	48210-2936	313-894-2850	3462	3569	3494	
1539	Kue-Ken Div Process Technology Corp	8383	Baldwin St		Oakland	CA	94621-1925	510-569-8382	3531G	5082X		
1540	Kunkle Valve Co	5409	Powell St		New Orleans	LA	70123-2306	504-733-3366	5075	3569D		
1541	Kyser Eastland	2301	E 2nd St		Odessa	TX	79761-4911	915-580-7100	7349V	3569D	3494	5084V
1542	L & D Industries	201	S Fulton		Auburn	IN	46706	219-925-4714	3599A			
1543	L & D Threading Co	7625	Rosecrans Ave		Paramount	CA	90723-2507	310-634-5106	3599A			
1544	L & L Tool & Manufacturing Inc	4924	Hillard Rd		North Little Rock	AR	72118-2477	501-758-7373	3544D			
1545	L & M Machine And Tool Co	105	Lehigh Ave		Hawthorne	NJ	07506	201-523-5288	3599A			
1546	L & S Tool Co	819	Farmington Ave		Berlin	CT	06037-1306	203-828-7892	3599A			
1547	L P Precision	3217	Edward Ave		Santa Clara	CA	95054-2306	408-727-5266	3599A			
1548	La Marche Manufacturing	106	Bradrock Dr		Des Plaines	IL	60018-1940	708-299-1188	3699D			
1549	Labelles Machine Service	1024	W Maude Ave		Sunnyvale	CA	94086-2814	408-746-2775	3599A			
1550	Ladd Machine Service	420	Air Park Rd		Ashland	VA	23005-3204	804-798-6205	3599A			
1551	Lafayette Machine Corp	4900	Henry Ave		Niagara Falls	NY	14304	716-236-0221	3599A	3599E	3545	
1552	Lafyette Grinding Corp	115	Banker St		Brooklyn	NY	11222-3161	718-388-5973	3541H			
1553	Lake Tool & Supply Co	255	Newell St		Painesville	OH	44077-1249	216-352-7105	3599E	5084Y		
1554	Lakeland Products	52	Abbott Ave		Coldwater	MI	49036-1430	517-639-4849	3089			
1555	Lakes Mold & Mach Co	665	Anderson Ave		Akron	OH	44306-3101	216-773-5111	3599K	3544E		
1556	Lakes Pipe & Supply Corp-Erie Div	1020	Holland St		Erie	PA	16501-2005	814-452-4300	3498	3494		
1557	Lakeside Machine Shop	549	Valley		Hot Springs	AR	71901-6129	501-624-4177	3599E	3599A	1791D	5051D
1558	Lalone Mike Inc	11000	Davisburg Rd		Davisburg	MI	48350-2614	810-625-0550	1781	3599E		
1559	Lamantia Machine Co	395	E Main St		Benton Harbor	MI	49022-4442	616-927-1886	3544D	3469		
1560	Lambach Walt Inc Fire Extngshr	348	River Dr		Bettendorf	IA	52722-4654	319-355-4694	3999	5063E		
1561	Lamco Machine Co	12330	Knigge Cemetery Rd		Cypress	TX	77429-3223	713-890-1188	3599A	1389B		
1562	Laminated Plastics	90	Washington St		Haverhill	MA	01832-5524	508-374-9000	3089			
1563	Lamjen Inc	3046	W 22nd St		Erie	PA	16506-2304	814-838-9681	3599A	3544D		
1564	Lancast Aluminum Inc	1644	W 135th St		Gardena	CA	90249-2506	310-532-7068	3365			
1565	Lancaster Machining Inc	3180	W Fair Ave		Lancaster	OH	43130-9568	614-687-0044	3599A			

1566	La[illegible] Metal Products Co	520	Slocum St		Lancaster	OH	43130-2951	614-653-3421	3544B	35[illegible]		
1567	La[illegible]chine Works	1904	Hwy 82 Bypass		Greenwood	MS	38930	601-453-6525	7699P	352[illegible]	[illegible]61B	5261C
1568	Landis & Gyr Powers Inc	1110	Old World Third		Milwaukee	WI	53200	414-347-7862	3829			
1569	Landis & Gyr Powers Inc	735	S 2nd Ave		Sioux Falls	SD	57104-5001	605-336-3788	5044D	3829		
1570	Lapco Industries Inc	1	John St		Haledon	NJ	07508-1452	201-956-7001	3541H			
1571	Lapp D A	11881	Prospect Rd		Cleveland	OH	44136-2931	216-238-3700	3322			
1572	Laree Inc	4819	Ne 12th Ave		Oakland Park	FL	33334-4803	305-491-2411	3599A	3469	3544E	3544D
1573	Larges Metal Fabrication	384	Pine St		Watsonville	CA	95076-4518	408-724-4432	3365	1761	3441	5084R
1574	Largo Machine Shop				Arcadia	MO	63621	314-546-7717	3599A			
1575	Larose Industries Inc	19101	15 Mi		Clinton Township	MI	48035	810-791-0040	3469			
1576	Larsen I J Pumps Inc	509	Tully Rd		Modesto	CA	95350-5853	209-529-2020	5084G	3599E		
1577	Larson Company A Clarkston	6380	Sashabaw Rd		Clarkston	MI	48346-2260	810-625-3303	1611G	3498	1623	
1578	Larson-Becker Co Inc	105	31st Ave		Rock Island	IL	61201-5916	309-794-0677	5084G	3599E		
1579	Las Cruces Machine Co	400	N 17th St		Las Cruces	NM	88005-8120	505-526-1411	5082A	3599A		
1580	Laser Mechanisms Inc	24730	Crestview Ct		Farmington	MI	48335-1506	810-474-9480	3699C			
1581	Laser Pro Labs	2560	Wyandotte St		Mountain View	CA	94043-2315	415-965-9884	3699C			
1582	Laser Shop The				Newhall	CA	91382	805-253-0204	3699C			
1583	Laser-Tec		Rr	2	Lexington	IL	61753-9802	309-365-8175	3699C			
1584	Lasmet Tool & Die Co	232	Wescott Dr		Rahway	NJ	07065-4706	908-381-0030	3544D			
1585	Lathrop Construction				New Milford	CT	06776	203-354-8914	1611Z	1771C	1794	3443A
1586	Latshaw Enterprises Inc	2533	S West		Wichita	KS	67203	316-942-7266	3829	3451		
1587	Laughlin Collision Service	8206	Edinboro Rd		Erie	PA	16509-4247	814-868-3717	3711B			
1588	Laurel Mould Inc	1101	Penn Ave		Jeannette	PA	15644-2038	412-527-5640	3544E			
1589	Lawco C N C	4421	Theiss Rd		Humble	TX	77338-1050	713-821-0665	3599A			
1590	Lawrence Products Inc	15087	Northville Rd		Plymouth	MI	48170-2548	313-420-4366	3599A			
1591	Lawruk Machine & Tool Co	302	E 6th Ave		Altoona	PA	16602-2799	814-943-6136	3599A	3541		
1592	Lawson-Yeates Inc	2565	S 300 W		Salt Lake City	UT	84115-2908	801-487-7800	3498	5211O	3088	3494
1593	Lay Mechanical Mntnce Co	210	E Buckingham Rd		Garland	TX	75040-4710	214-487-0404	3599D			
1594	Layke Inc	3330	W Osborn Rd		Phoenix	AZ	85017-4810	602-272-2654	3599A			
1595	Layman B W & Sons	4812	Eagle Rd		White Lake	MI	48383-1201	810-887-5640	5084G	3599E	1781	
1596	Layne-Western Company Inc	3108	S Covell Ave		Sioux Falls	SD	57105-5520	605-335-7726	8711M	3599E	5082H	
1597	Le Blond Makino Machine Tool	409	Plymouth Rd		Plymouth	MI	48170-1834	313-453-0390	3541			
1598	Le Jeune Machine Shop & Iron Works Inc		Hwy	13	Eunice	LA	70535	318-457-8113	3548A			
1599	Le Ran Copper & Brass Co	4400	Broadway		Depew	NY	14043-2915	716-684-6492	3364A			
1600	Learjet Corp	739	Roosevelt Rd		Glen Ellyn	IL	60137-5877	708-790-0607	3721			
1601	Lebanon Equipment Co				Lebanon	VA	24266	540-889-2584	5999	3569	5261C	5511B
1602	Lee Battery Service Inc	2675	Statehwy No	70	Manasquan	NJ	08736	908-528-5337	3691	3699D		
1603	Lee Machine Co	23	Francis J Clarke Cir		Bethel	CT	06801-2861	203-794-9509	3599A	5084	7692D	
1604	Lee Quigley Company The				Concord	CA	94520	510-680-7546	3471C	3399		
1605	Leese & Co Inc		Rr	3	Greensburg	PA	15601-9803	412-834-5810	3599K	3599A		
1606	Lenco Company		Lenco Plaza		Waverly	NE	68462	402-786-2000	3089	3544E	8999W	
1607	Lenmar Tool & Die Co Inc		1954a Birchall Ave		Bronx	NY	10400	718-823-6060	3544D	3599A		
1608	Lepsik Manufacturing	1805	Little Orchard St		San Jose	CA	95125-1007	408-971-6005	3599A			
1609	Lesco Mfg Co Plastcs	2020	Lincoln Ave		Pasadena	CA	91103-1323	213-681-4971	3089			
1610	Letco Inc	851	N Belcrest Ave		Springfield	MO	65802-2591	417-831-1528	1791D			
1611	Levelite Technology Inc	1340	Space Park Way		Mountain View	CA	94043-1308	415-254-5980	3829C			
1612	Leviton Manufacturing Co Inc	2445	Merwdln		Havertown	PA	19083	610-446-7544	3699			
1613	Lewallyn Advanced Technologies	4887	E Nance Springs Rd		Resaca	GA	30735	706-277-1142	5084D	3599F	3599E	
1614	Lewis Co The	9019	Steeleberry Dr		Charlotte	NC	28217-5315	704-588-2681	3469			
1615	Lewis Tool & Die	1008	2nd St Ne		Bondurant	IA	50035-1019	515-967-2775	3544D			
1616	Lewis Well Drilling	2376	S Charlton Park Rd		Hastings	MI	49058-9124	616-945-4272	3599E	1781		
1617	Liberty Air Power Inc				Douglasville	GA	30134	770-949-1897	3699			
1618	Liberty Tool & Die Co	5101	W 161st St		Cleveland	OH	44142-1604	216-267-4744	3599A			
1619	Lidgerwood Mfg Co	1101	John Ave		Superior	WI	54880-1640	715-394-4444	3599A	7692D		
1620	Light Solutions Corporation				Acton	MA	01718	508-264-9003	3699C			
1621	Lilly Machinery Inc		C R 2213 Rl Lilly Rd		Tyler	TX	75703	903-561-6733	3599A	3541	3599D	
1622	Lind Auto Parts Mapco	1720	N Beale Rd		Marysville	CA	95901-6911	916-742-7336	7538C	5531A		
1623	Lindberg Heat Treating Company	130	Huntingdon Ave		Waterbury	CT	06708-1419	203-755-9119	3398			

1624	Lind[illegible]chinery Co Inc	2817	Columbia Ave		Indianapolis	IN	46205-4056	317-924-4828	7389A	738[illegible]	[illegible]389B	3541
1625	Lir[illegible]sley				Clancy	MT	59634	406-933-5511	3541C	50[illegible]	[illegible]84G	3599E
1626	Lindsey & Gowans Machine Co Inc	924	N Selvidge		Atlanta	GA	30316	706-272-1041	3599A	179[illegible]	1711	7692D
1627	Lindsley Machine Shop	187	N 4700 E		Rigby	ID	83442-5965	208-538-7717	3599E			
1628	Lingefelt Billy Matrl Handing Eqpt	1010	Seed Farm Rd		Westminster	SC	29693-4314	803-647-4291	5084E	7538A	3494	
1629	Lintons Mechanical Services		Hwy	52	Charleston	SC	29420	803-572-0955	1711N	1791D		
1630	Lithonia Lighting Reloc Wiring Div	1	Lithonia Way		Decatur	GA	30035-4141	770-987-4200	3829	3699	3648	
1631	Livingston & Haven Connectors	3400	Saint Vardell Ln		Charlotte	NC	28217-1372	704-525-8802	3494			
1632	Lmb Construction	690	W 4th St		Eureka	MO	63025-1806	314-938-3352	5084L	1541	3443A	
1633	Lnc Services Corp	825	Riverside Ave		Paso Robles	CA	93446-2654	805-239-4215	3544D			
1634	Lock Ridge Tool Co	1021	W Kirkwall Rd		Azusa	CA	91702-5127	818-334-4416	3544D			
1635	Loda Enterprises Inc	8517	Birch Dr		Omaha	NE	68128-2417	402-593-7366	3569H	3953	3993E	
1636	Logan Corp		Claypool Hill		Richlands	VA	24641	540-963-1011	3999	3569	5082X	
1637	Lohr & Herrmann Technology Inc	25	Olympia Ave		Woburn	MA	01801-6307	617-933-0678	3541			
1638	Lombardo Raymond J	211	Shaker Rd E		Longmeadow	MA	01106	413-525-6998	3599A			
1639	London Homer Alignment Service	714	Scotland Ave		Gainesville	GA	30501-4304	770-532-7171	3559M			
1640	Long Beach Machinery	1262	W 16th St		Long Beach	CA	90813-1306	310-432-2721	3599E			
1641	Long G L Co	4720	Greenwood St		Lincoln	NE	68504-2050	402-464-7369	5932U	7538C	7539	3599A
1642	Longo Industries	1625	Pennsylvania Ave		Linden	NJ	07036-1761	908-925-2900	5063C	3599E		
1643	Longo Machinery Sales	9831	Klingerman St		South El Monte	CA	91733-1897	818-401-2828	3599E			
1644	Longs Motor Equipment	115	E Hensley Blvd		Bartlesville	OK	74003-2615	918-336-6350	7538C	5531A		
1645	Longyear	7773	W Seldon Ln		Peoria	AZ	85345-7973	602-486-1881	3541C			
1646	Longyear Co Sales	2340	W 1700 S		Salt Lake City	UT	84104-4240	801-972-1395	3541C			
1647	Loranger International Corp				San Jose	CA	95100	408-727-4233	3825B			
1648	Lorraine Instrument	2514	N Velasco St		Angleton	TX	77515-3029	409-849-8020	3494			
1649	Lou Jan Tool & Die Co	161	E Johnson Ave		Cheshire	CT	06410-1209	203-272-3536	3599A			
1650	Lowell Manufacturing Inc	12	Valley Rd		York	PA	17407-1236	717-428-2002	3599A			
1651	Loyal Machine	1211	Badger St		Yorkville	IL	60560-1702	708-553-1242	3599A			
1652	Lp Brazing Inc	210	Andover St		Wilmington	MA	01887-1229	508-658-2295	3548	3599A		
1653	Lpg Industries	307	N Sycmrerd		Clifton Heights	PA	19018	610-622-2900	3823			
1654	Ltv Steel Tubular Products	115	Raven Rd		Monticello	GA	31064-9136	706-468-0422	3312			
1655	Lu Paul Tool & Die Co	503	E Biddle St		Jackson	MI	49203-1877	517-789-7779	3544D			
1656	Lube Systems Inc	17171	Park Row		Houston	TX	77084-4927	713-578-3314	5099C	3531A		
1657	Ludwig Michael S Drilling	8673	W Rice Ave		Littleton	CO	80123-1165	303-933-0059	3541C			
1658	Lujon Engineering	7320	Adams St		Paramount	CA	90723-4008	310-634-4241	3599A	3451		
1659	Luke Steel	1910	Lulu St		Wichita	KS	67211-4425	316-263-8489	3599A	3441	7692D	
1660	Luke Tool & Engineering Co	391	S1strd		Hammonton	NJ	08037	609-561-4048	3599A			
1661	Luma Metalcraft Inc	1930	N Leclaire Ave		Chicago	IL	60639-4423	312-804-9400	3365	3399	3444	1761
1662	Lundwall Mach Co	1150	Pontiac Ave		Cranston	RI	02920-7921	401-785-2226	3599A			
1663	Lycro Products Inc	66557	State Road	19	Wakarusa	IN	46573-9708	219-862-4981	3599A	3469	7692D	
1664	Lyn-Mar Machine & Tool	111	Mill		Parma	MI	49269	517-531-5161	3599A			
1665	Lynch Plumbing & Pump Co				Los Altos	CA	94023	415-948-5561	5084G	3599E		
1666	Lynns Quality Machine Shop	5710	N Highway	81	Enid	OK	73701	405-234-2051	3599A			
1667	Lynott Implement Inc		Hwy 12 S		Hawarden	IA	51023	712-552-2311	3523			
1668	Lynwood Tier Center Inc	2390	Glenwood Dyer Rd		Chicago Heights	IL	60411-8622	708-474-2070	5531C	7538	3559M	
1669	Lynx Machine & Tool Co		Phipps Bend Industrial Rd		Surgoinsville	TN	37873	615-345-5020	3599A	3544D		
1670	Lyon Manufacturing Inc	13017	Newburgh Rd		Livonia	MI	48150-5009	313-591-0606	3451			
1671	Lyons Transportation Lines		S Allegheny Ave		Reno	PA	16343	814-677-3089	3721			
1672	Lyons Well Drilling Inc		G-8107 N Dort		Mount Morris	MI	48458	810-686-3980	3599E	1781		
1673	M & D Pump Service	490	Rosalie Rd		Bailey	CO	80421-2061	303-838-5367	5084G	3599E		
1674	M & G Machining	7505	N 69th Ave		Glendale	AZ	85303-1719	602-939-7741	3599A			
1675	M & H Machine & Welding	1703	Bench Mark Dr		Austin	TX	78728-7720	512-251-2768	3599A			
1676	M & J Mach Shop	2420	Pickle Rd		Akron	OH	44312-4227	216-645-0042	3599A			
1677	M & J Machining	135	Aviation Way		Watsonville	CA	95076-2000	408-724-5712	3599A			
1678	M & M Hydraulic Co	2505	County Road E W		Saint Paul	MN	55112	612-635-9414	3511	3494	3599E	3599A
1679	M & M Industrial Supply	104	S Bridge		Kankakee	IL	60902	815-933-1775	3569			
1680	M & M Machine Service Inc	7604	Energy Pkwy		Pasadena	MD	21122	410-360-0047	2399	3599A		
1681	M & M Services Inc	318	Minnesota Dr		Troy	MI	48083-4610	810-589-0910	3599A			

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1682	M [illegible]pply Co	9103	Mich		Dearborn	MI	48120	313-582-9300	7538U	359[illegible]		
1683	M [illegible]ining Inc	205	Utah St		Toledo	OH	43605-2243	419-697-1986	3599A			
1684	M & T Machine Shop		Pearson Knobb Lane		Taylorsville	NC	28681	704-632-9934	3599A	3541		
1685	M A I W Of Tulsa	1110	N Iroquois Ave		Tulsa	OK	74106-5901	918-587-6087	3714			
1686	M And M Thread And Assembly	2832	Elliott Dr		Troy	MI	48083-4635	810-583-9696	3599A	3541F		
1687	M F I Corporation	4273	Will Rogers Pkwy		Oklahoma City	OK	73108-2039	405-947-5100	3599A			
1688	M K Machine & Tool Co	1499	Delp Dr		Harleysville	PA	19438-2936	215-256-9881	3544D	3599A		
1689	M L S Screw Machine	10	Dexter Rd		East Providence	RI	02914-2004	401-435-3850	3451			
1690	M O S Tool & Engineering	2233	Calle Del Mundo		Santa Clara	CA	95054-1017	408-748-1166	3089	3544E		
1691	M S K Precision Products Inc	4571	Nw 8th Ave		Oakland Park	FL	33309-3936	305-776-0770	3451	3599A		
1692	M W Industries Inc	215	E Helms Rd		Houston	TX	77037-1601	713-448-3510	3544D	3452	5085	3469
1693	M-1 Tool Works Inc	1419	S Belden St		Mc Henry	IL	60050-8399	815-344-1275	3544			
1694	Mac Donald Molding Inc	36870	Green St		New Baltimore	MI	48047-1605	810-725-2111	3089			
1695	Mac Machine Co	1719	Whitehead Rd		Baltimore	MD	21207-4085	410-944-6171	3599A			
1696	Macdonalds Industrial Produ	850	Pannell Ave Nw		Grand Rapids	MI	49504-2812	616-363-4844	3363			
1697	Mach 1 Production Machine	36	Marie St		Plainfield	CT	06374-2210	203-564-6855	3599A			
1698	Machine & Rebuild	4947	Cash Rd		Flowery Branch	GA	30542-5102	770-967-8852	7538	3599A		
1699	Machine Engineers	651	E 8th St		Jacksonville	FL	32206-3999	904-353-8289	3599A	7692D		
1700	Machine Industries Inc	1019	Starr Ave		Eau Claire	WI	54703-1820	715-832-8100	3599A			
1701	Machine Services	212	Southland Ave		Bushnell	FL	33513	904-793-7930	3599A			
1702	Machine Shop	555	Linden Ave		Gustine	CA	95322-1431	209-854-6279	3599A			
1703	Machine Shop Services	156	Main St		Dubuque	IA	52001-7629	319-557-9176	3599A			
1704	Machine Shop Solutions				Bensalem	PA	19020	215-639-8522	7538C			
1705	Machine Tech Industries	127	S Terrace Ave		Mount Vernon	NY	10550-2407	914-665-0855	3599A			
1706	Machine Tool Electronics Services	47260	Freedom Valley		Roseville	MI	48066	810-778-7477	3599D			
1707	Machine Works	430	S 1st St		Albemarle	NC	28001-5717	704-983-5968	3599A			
1708	Machinery Center Div Veet Industries	25755	Groesbeck Hwy		Warren	MI	48089-3671	810-776-3000	3599E			
1709	Machinery Center Inc	1559	W 3860 S Vly Cty		West Valley City	UT	84119-6291	801-972-1794	5932Y	3599E	5082X	
1710	Machinery Service Co		W Alna Rd		Wiscasset	ME	04578	207-882-6788	3599A	3599E		
1711	Machinery Wholesales Corporation	5924	S 94th East Pl		Tulsa	OK	74145-8325	918-250-3666	3541	5932		
1712	Machtech Industrial Corp				Pompano	FL	33062	305-946-3852	3599E			
1713	Mack W K Enterprises	6060	S 300 W Murray		Murray	UT	84107-6995	801-263-7766	5511	3569E		
1714	Mackenzie Products Co Inc		State Hwy No	34	Belmar	NJ	07715	908-681-0200	3599A			
1715	Macuch Steel Products Inc	1527	Augusta Ave		Augusta	GA	30901-3465	706-823-2420	3446C	1791D	7542C	3441
1716	Magnesium Die Casting	200	Maple Park Blvd		Saint Clair Shores	MI	48081-2211	810-773-4500	3363			
1717	Magness Manufacturing Co	1604	N 161st East Ave		Tulsa	OK	74116-4823	918-438-2755	3599A			
1718	Magnetic Cores Div Of Nor-Mag	250	Bishop Ave		Bridgeport	CT	06610-3044	203-335-9921	3316			
1719	Magnetrol Controls	7988	Capwell Dr		Oakland	CA	94621-2106	510-568-7000	3429A	3829	5084V	3569J
1720	Magnum Mach Co Inc	9535	Jackson St		Mentor	OH	44060-4515	216-352-7720	3544B	3599A		
1721	Main Machine Industries Inc	2815	E Main St		Canon City	CO	81212-4011	719-275-6548	3599A	3469		
1722	Mairs & Power Inc Invstmt Serv		1st Natl Bank Bldg		Saint Paul	MN	55100	612-222-8478	3699			
1723	Manca Inc	165	Carver Ave		Westwood	NJ	07675	201-666-4100	3545	5084D		
1724	Manchester Machine & Rpr	328	N 10th St		Haledon	NJ	07508-2120	201-790-4042	3599F			
1725	Manck Machine Co Inc		Tatum Hwy		Henderson	TX	75652	903-657-2869	3599A	7692D		
1726	Manhasset Tool & Die Co	4270	Walden Ave		Lancaster	NY	14086-9770	716-684-6066	3599A			
1727	Manhattan Tool Co Inc	1450	Stratford Ave		Stratford	CT	06497-6434	203-377-5600	3569			
1728	Manley Tool & Machine	1551	N Courtney Rd		Independence	MO	64050-6214	816-836-9766	3599A			
1729	Manning Manufacturing	35	Spencer St		Stoneham	MA	02180-2615	617-279-2311	3599A			
1730	Manor Auto Parts Corp	1326	New York Ave		Huntington Station	NY	11746-1703	516-427-3300	3559M			
1731	Manufacturing Development I	37515	W Harry		Cheney	KS	67025	316-542-3166	3724			
1732	Manufacturing Equipment Co Inc	742	Black Snake Rd		Easley	SC	29640-9658	803-855-2647	7359E	3545	3541	
1733	Manufacturing Services Inc	709	Edge St		Fort Walton Beach	FL	32547-2903	904-864-2400	3599A			
1734	Manufacturing Technology Inc	2226	Goodyear Ave		Ventura	CA	93003-7750	805-644-9681	3599A			
1735	Manufax	1324	Barlow St		Traverse City	MI	49686-4312	616-929-3226	3544E			
1736	Mapelli Inc	1287	Washington Hwy		Elberton	GA	30635-2748	706-283-7405	3291			
1737	Maple Machinery Inc	1625	N Garvin St		Evansville	IN	47711-4566	812-425-0099	3599E			
1738	Maple Mold Technologies	1985	Northfield Dr		Rochester Hills	MI	48309-3824	810-853-0308	3544E			
1739	Mar Ron Industies	2628	Wilkinson Blvd		Lowell	NC	28098	704-824-9554	3599A			

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1740	Ma[illegible] ngineering Co	7350	Greenbush Ave		North Hollywood	CA	91605-4003	818-765-4805	3599A	509		
1741	M[illegible] ts & Machining	4280	W Reno Ave		Las Vegas	NV	89118-1616	702-364-8234	3594A	35		
1742	Mar[illegible]on Mach Engineering Corp	4212	Airport Rd		Cincinnati	OH	45226-1614	513-321-9811	3599A			
1743	Marchi Associates	45	Hazel Ave		Redwood City	CA	94061-3110	415-364-3411	3829	3823		
1744	Marco Edm Inc	37648	Hills Tech Dr		Farmington Hills	MI	48331-5727	810-553-3390	3599K			
1745	Marco Sales Co	3975	E 56th Ave		Commerce City	CO	80022-3661	303-297-1220	3829	5075B		
1746	Marcus Curt	1609	16th Ave Nw		Willmar	MN	56201-2090	612-235-0452	3599E	5082H		
1747	Marden Industries Inc		State Rd 640 E		Lakeland	FL	33801	941-682-7882	3523			
1748	Marf General Machine Work Inc	2324	E 4th Ave		Tampa	FL	33605-5412	813-247-3242	3599A	3599F		
1749	Markco Machne Wrks	6501	Golder Ave		Odessa	TX	79764-2831	915-362-8921	3599A			
1750	Markey Machinery Company In	7266	8th Ave S		Seattle	WA	98108-3403	206-622-4697	3599A	5084D	3599E	3599F
1751	Marklyn Controls & Supply Inc	550	Dekalb Rd		Farmington	NM	87401-1642	505-327-5071	5084V	3498	5085H	3494
1752	Marks Well & Pump	815	Aspen Knls		Hibbing	MN	55746-3841	218-262-3401	5084G	5082H	3599E	
1753	Marlin Machine Co	105	8th Ave Nw		New Brighton	MN	55112-7769	612-633-6719	3599A			
1754	Maro Precision Inc		Hwy 301 S		Sharpsburg	NC	27878	919-977-6764	3544B	3599A		
1755	Marsh Industrial Sheet Metal Works Inc		Hwy 52 North		Cheraw	SC	29520	803-537-7694	1791D			
1756	Marsh Jerry Mch Shops	1442	Perkins		Joplin	MO	64801	417-781-7181	3599A	3544D		
1757	Marshalltown Instruments Co	2603	Parmenter Blvd		Royal Oak	MI	48073-1012	810-280-0000	3829			
1758	Martin K H Precision Machining	11801	Slauson Ave		Santa Fe Springs	CA	90670-2219	310-698-5503	3599A			
1759	Marty Equipment Co	623	S Lake St		Tucumcari	NM	88401-2542	505-461-1236	3523			
1760	Maruka Machinry Corp Mori-Seiki	16	Chapin Rd		Pine Brook	NJ	07058-9718	201-227-2343	3545	3541		
1761	Marwais Steel Co	700	Larkspur Landing Cir		Larkspur	CA	94939-1715	510-223-8883	3312			
1762	Marwald West Inc				Modesto	CA	95352	209-523-7861	3523			
1763	Marwell Corp	1094	N Wabash Ave		Redlands	CA	92374-3936	909-794-4192	5075B	3699		
1764	Maryland Metals Inc Security Yard	304	W Church St		Hagerstown	MD	21740-4728	301-739-5525	3545	1795	3523	3498
1765	Maser Alfred W Co Inc	924	Fox Chase Rd		Philadelphia	PA	19111	215-379-0100	3569	3541		
1766	Mason Chico Machinery Inc Contrs Eqp	7325	Up River Rd		Corpus Christi	TX	78409-2814	512-289-6361	5082A	7359M	3599E	
1767	Mason Header Die	519	Mason		Mason	MI	48854	517-676-0350	3544D			
1768	Mason Machine	477	Windy Hill Rd		Blairsville	GA	30512-4111	706-745-9324	3599A	7692D		
1769	Master Die Cutting	1232	Los Vallecitos Blvd		San Marcos	CA	92069-1476	619-744-0679	3999L			
1770	Master Metal Engineering	4520	S Burnette Dr		South Bend	IN	46614-3820	219-299-0222	3599A			
1771	Master Pumps & Equipment Corp	427	W Commerce St		Dallas	TX	75208-1957	214-741-9007	3561	3599E		
1772	Mastercraft Pattern Works	345	E Cottage Pl		York	PA	17403-3219	717-854-8911	3365	3999A	3543	
1773	Matchmaker Machine Shop		Route	365	Vernon	NY	13476	315-363-8534	7538C			
1774	Mathieu Arms-Development Inc	23850	Clawiter Rd		Hayward	CA	94545-1723	510-782-9273	3599A			
1775	Mattei Inc Metal Works		Garrett Rd		Harlingen	TX	78550	210-421-3936	1791D	3441		
1776	Matthew Machinery Sales Inc	4104	Bishop Ln		Louisville	KY	40218-4504	502-962-9889	3541	5084D	3599E	3444
1777	Matthiessen-Royall Equipment &	446	Culebra Rd		San Antonio	TX	78201-6417	210-734-4363	5084A	5082A	7359M	3494
1778	Maurer Industrial Supply In	29066	Lexington Park Dr		Elkhart	IN	46514-1193	219-293-7442	5251	5085	3569	3452
1779	Mayer Malbin Co Inc		Morristown Area		Morristown	NJ	07960	201-267-9717	3494			
1780	Mayfield Foundry Inc		W 5 Ave		Beaver Falls	PA	15010	412-846-0660	3369			
1781	Mazak Machine Tools	770	E North Belt		Houston	TX	77038	713-931-7770	3541			
1782	Mbc Precision Machining & Hydraulics	6015	Ridgemont St		Houston	TX	77087-2009	713-643-8571	3599E	3599A	1629L	
1783	Mc Connell Machinery Co	1111	E 23rd St		Lawrence	KS	66046-5005	913-843-2676	3523	5261B	5261C	5511B
1784	Mc Coys Machine Shop	807	Wichita St		Wichita Falls	TX	76304-3229	817-322-2371	3599A			
1785	Mc Cullough Machine Co		Rr	1	New Derry	PA	15671-9801	412-694-8485	3599A			
1786	Mc Donnell Douglas Aircraft		Naval Air Sta		Paluxent River	MD	20670-5000	301-863-2200	3724	5599A	4581F	3721
1787	Mc Dowell Machining	2638	Spring St		Redwood City	CA	94063-3522	415-364-2093	3599A			
1788	Mc Kinney Drilling Co	3150	E Walnut St		Colmar	PA	18915-9756	215-822-3328	3541C			
1789	Mc Kisick Drilling Inc	13307	E Apache St		Tulsa	OK	74116-1424	918-437-2846	3541C	1771E		
1790	Mc Minnville Tool & Die Inc	318	Needmore Rd		Mc Minnville	TN	37110-1489	615-473-8464	3544D	3469	3544E	
1791	Mc Neill Manufacturing	3014	Chapman St		Oakland	CA	94601-2805	510-533-3747	3599A			
1792	Mccreery Corp	28914	Lakeland Blvd		Wickliffe	OH	44092-2321	216-943-3636	3531G			
1793	Mccullough & Benton Inc	1746	Northeast Expwy Access Rd		Atlanta	GA	30329	404-325-1606	3531A	5198		
1794	Mcdermott Machine Shop		Po Box	241	Winnie	TX	77665-0241	409-296-2241	3599A			
1795	Mcdonnell Douglas Arcrft Co Lng Bch Hts Abc	3855	N Lakewood Blvd		Long Beach	CA	90846-0003	310-429-2495	3721			
1796	Mcewen Boy L	1576	14th	St-1/2	Barron	WI	54812	715-537-3005	3599A	3441	3914	
1797	Mcgee Jack W Non-Ferrous Metals Inc	2906	16th Ave Sw		Seattle	WA	98134-1022	206-624-8414	3339	1031	5093A	3548

1798	Mc [illegible] Construction Co	1185	Laurel		Florence	OR	97439	503-997-7989	3541C	331		
1799	Mc [illegible] omponent Technology Inc	9831	S 51 St		Tempe	AZ	85284	602-893-8991	3825B			
1800	Mdm Technologies	333	Firs		Elizabeth	NJ	07201	908-353-7800	3699C	7331		
1801	Mead Greg		Hwy	2	Bonners Ferry	ID	83805	208-267-2897	7699	2411	3599A	
1802	Meadows Machine Shop Inc	1930	S Vandeventer Ave		Saint Louis	MO	63110-3220	314-771-2200	7538C			
1803	Measurement Control Systems In	1331	S Lyon St		Santa Ana	CA	92705-4608	714-835-0995	3829	5063N		
1804	Mec Pro Inc	980	George St		Santa Clara	CA	95054-2705	408-727-9757	3599A			
1805	Mech-Tron Engineering Div	61	Arrow Rd		Wethersfield	CT	06109-1302	203-529-2507	3599A			
1806	Mechanical Art Works	96	Monroe St		Newark	NJ	07105-2109	201-589-4850	3451	3399		
1807	Mechanical Engineer Controls Automation Cor	1800	Markle Ave		Elkhart	IN	46517-1322	219-294-7580	8711J	3599F		
1808	Mechanical Logistics Inc	2421	W Cucharras St		Colorado Springs	CO	80904-3048	719-636-1370	3599A			
1809	Mechanical Systs Of Dayton Inc	4358	Springfield St		Dayton	OH	45431-1039	513-254-3235	1711	1711B	1711A	3444
1810	Mechanism Manufacturing	62	Enterprise Dr		Ann Arbor	MI	48103-9503	313-665-2046	3599A			
1811	Mechni Arts Inc	8171	Cole Pkwy		Bonner Springs	KS	66012	913-422-7335	3599A			
1812	Medford Equipment Co	8	Brookside Dr		Medford	NJ	08055-9238	609-654-4887	3599E			
1813	Medso Inc	54	Hubbard Ave		San Fernando	CA	91340	818-365-5010	3599A			
1814	Meltons Precision Machine Sho	7338	Varna Ave		North Hollywood	CA	91605-4015	818-765-6342	3599A			
1815	Merco Plastic Mold & Genl Machine Work	2377	Hoffman St		Bronx	NY	10458-8002	718-220-2884	3599A	3089		
1816	Mercoid Corporation The Distrbtr	223	Fort Pitt Blvd		Pittsburgh	PA	15222-1505	412-471-3222	3694	3829	5084V	3823
1817	Mercury Engineering Co Inc	2027	Shelby St		Indianapolis	IN	46203-4045	317-783-7879	3541	7389D	7389F	3599F
1818	Merritt Enterprises Inc	33	Columbus Blvd		New Britain	CT	06051-2243	203-223-1801	3599A			
1819	Metal Container Corp	105	E Blackhawk Dr		Fort Atkinson	WI	53538-1158	414-563-7720	3354			
1820	Metal Cutting Service	16233	Gale Ave		La Puente	CA	91745-1719	818-968-4764	3541			
1821	Metal Polishg	4685	Interstate Dr		West Chester	OH	45069	513-860-9953	3569E			
1822	Metal Processors Inc	200	Falkenburg Rd S		Brandon	FL	33511	813-654-0050	3542			
1823	Metal Specialties	538	S Ireland St		Burlington	NC	27217-3944	910-228-6080	1791D			
1824	Metalcraft Of Mayville Inc	2600	Metalcraft Rd		West Bend	WI	53095-5249	414-338-4035	3399			
1825	Metalflake Corporation		Haverhill Rd		Amesbury	MA	01913	508-388-6670	3714			
1826	Metals & More	713	1st		East Moline	IL	61244	309-796-0633	3399			
1827	Metalscorp Inc	6970	108th Ave		Largo	FL	34647-1666	813-544-2521	3334	5051D		
1828	Metric Machine	1041	Po Box		Sanford	NC	27331	919-776-9331	3599			
1829	Metric Tool	21989	Us Highway 19 N		Clearwater	FL	34625-2361	813-791-8189	3599A			
1830	Metro Assemblies	3901	Foss Rd		Minneapolis	MN	55421-4510	612-789-8623	2399	3089	3679A	
1831	Metro Machine & Tool Co	9350	H Ct		Omaha	NE	68127-1246	402-331-1599	3599A			
1832	Metro Machine Tool	9810	Lunceford Ln		Denver	CO	80221-5626	303-252-4427	3541			
1833	Metro Plastics Technologies In	9175	E 146th St		Noblesville	IN	46060-4310	317-776-0860	3089	3544E		
1834	Metro Structural Services Inc	4641	S Braden Ave		Tulsa	OK	74135-7020	918-627-0267	1771	1629C	3541C	1771E
1835	Metro Tool Co	7325	Hamlin Ave		Skokie	IL	60076-3902	708-673-6790	3545			
1836	Meyer Mach Tool Co	3434	E 7th Ave		Columbus	OH	43219-1735	614-235-0039	3599A	3544D		
1837	Mico Machining Mfg Co Inc	1220	Enterprize Dr		Winchester	KY	40391-9668	606-744-5618	3599A			
1838	Micracor Inc	43	Nagog Park		Acton	MA	01720-3426	508-263-1080	3699C			
1839	Micris Chemical Inc	174	Belmont Rd		Hawthorne	NY	10532-2102	914-747-0767	3291			
1840	Micro Edm Specialties	50	Commercial St		Webster	NY	14580-3106	716-872-4600	3599K	3544E		
1841	Micro Industrial				Seattle	WA	98116	206-938-2949	7379C	3829		
1842	Micro Machine	1725	W Picacho Ave		Las Cruces	NM	88005-2338	505-524-1497	7538C	7538U		
1843	Micro Max Corp Chemicls		N8884 Rhine Rd		Elkhart Lake	WI	53020-1617	414-876-2577	3291			
1844	Micro Technology Inc	208	E Monroe St		Tullahoma	TN	37388-4517	615-454-1282	3599A			
1845	Micro Technology Of Brevard Inc	3900	Dow Rd		Melbourne	FL	32934-9255	407-242-7221	3599A			
1846	Micro Tronics	2905	S Potter Dr		Tempe	AZ	85282-3159	602-437-8995	3599K	3599A	3069	
1847	Microcontrol Systems Inc	105	Southvwct		Canonsburg	PA	15317	412-941-1390	3829			
1848	Micromech Mfg Corp	300	Cox St		Roselle	NJ	07203-1704	908-245-0505	3541			
1849	Micron Production Grinding	6100	Birch Rd		Flint	MI	48507-4649	810-235-2900	3541H			
1850	Mid America Fittings	10411	Hickman Mills Dr		Kansas City	MO	64137-1602	816-765-1060	3494	3451	3498	
1851	Mid Atlantic Instrumentation I				Norfolk	VA	23500	804-627-4470	3498			
1852	Mid State Tool & Machine Co Service Dept	1904	Hatcher Rd		North Little Rock	AR	72120-9585	501-835-3300	3599A			
1853	Midbrook Products Inc	2080	Brooklyn Rd		Jackson	MI	49203-4744	517-787-3481	3699	3699C	3599A	3599E
1854	Midbrook Products Inc Machining Division	2080	Brooklyn Rd		Jackson	MI	49203-4744	517-787-3481	3699	3699C	3599A	3599E
1855	Middendorff Well Co	102	Beech		Sioux Rapids	IA	50585	712-283-2270	3541C	5082H		

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
1856	Mi[illegible] Tool & Machine Inc	262	Mt Vernon		Milford	NH	03055	603-673-1114	3541H	359[illegible]		
1857	Mi[illegible]chine Shop	211	99th St E		Tacoma	WA	98445-2013	206-536-3277	3599A			
1858	Midland Pipe & Supply Co	2829	61st Cicero		Cicero	IL	60650	312-242-4200	3498	171[illegible]	3494	
1859	Midville Tool & Die Co Inc				Midville	GA	30441	912-589-7250	3599A			
1860	Midway Tool Engineering Company Inc	651	Westmnstrrd		Wilkes Barre	PA	18602	717-655-6844	3599A			
1861	Midwest Fluid Components	10151	Summit Ave		Cincinnati	OH	45241-1023	513-563-0745	3494			
1862	Midwest Mold & Engineering		Hwy 163 W		Pella	IA	50219	515-628-2371	3544E			
1863	Midwest Steel Rule Dies Inc	303	Causeway Blvd		La Crosse	WI	54603-3118	608-785-0300	3999L	3544D		
1864	Midwest Supply Co	1742	E 6th St		Tulsa	OK	74104-3294	918-583-6175	3291	7389C	3429A	2952
1865	Milco Wire Edm	15611	Product Ln		Huntington Beach	CA	92649-1345	714-373-0098	3599K			
1866	Mile Hi Machine Inc	6395	W 56th Ave		Arvada	CO	80002-2797	303-425-0760	3599A			
1867	Miles Auto Parts	1322	Prueter Rd		Saginaw	MI	48601-6611	517-754-0445	3559M			
1868	Milex Instrument Pr	455	Commercial Ave		Palisades Park	NJ	07650-1226	201-944-8774	3451			
1869	Miller Dial Corp	4400	Tempie City Bl		Lomita	CA	90717	818-444-4555	3999L	3993E		
1870	Miller Electric & Fire Protection	2007	70th Ave W		Tacoma	WA	98466-5540	206-564-4554	1731	5063E	3999	3569E
1871	Miller Engineering & Testing	21	Markarlyn St		Auburn	ME	04210-4809	207-786-4249	3541C	8748L	8711F	8734
1872	Miller Machine & Grind Serv	8530	M-89		Richland	MI	49083	616-629-9678	7538C	3541H	3594A	3599A
1873	Miller Tool & Die Co Inc	791	4th St		Mayville	WI	53050-1804	414-387-4040	3544D			
1874	Miller Well & Pump Co Inc	6600	Sw 13th St		Gainesville	FL	32608-5417	904-376-7924	5084G	3599E	1781	
1875	Millers Engine Machine & Parts	1083	Bunker Hill Rd		Cookeville	TN	38501-3956	615-526-5272	7538C	3599A		
1876	Mills Precision Industries	7702	Balboa Blvd		Van Nuys	CA	91406-2244	213-873-6770	3599A			
1877	Milltech	19	S Canal St		Lawrence	MA	01843-1412	508-686-1501	3599A			
1878	Minimac Machine Inc	30993	Huntwood Ave		Hayward	CA	94544-7000	510-489-7192	3599A			
1879	Mise & Nerco Mch Shop	6518	Alder Dr		Houston	TX	77081-4402	713-666-0357	3599A			
1880	Mitchell Machinery Sales	301	E Havens St		Mitchell	SD	57301-4403	605-996-6231	3523			
1881	Mitrek Mold	106	Verdi St		Farmingdale	NY	11735-6321	516-249-3399	3089			
1882	Mize & Company	300	Induatrial Dr		Kingman	KS	67068	316-532-3191	3714			
1883	Mkw Enterprise		Depot Rd		Colchester	VT	05446	802-879-6882	3569	3494		
1884	Mmcc Inc	101	Clematis Ave		Waltham	MA	02154-7030	617-893-4449	3369			
1885	Modern Machine & Grinding Inc	2001	Clark Rd		Dyer	IN	46311-1704	219-322-1201	3541H			
1886	Modern Machine & Stamping Co	28533	Holiday Pl		Elkhart	IN	46517-1193	219-293-8504	3469			
1887	Modern Machine Service Co	3714	W Burnham St		Milwaukee	WI	53215-2025	414-383-2401	3599A			
1888	Modern Mold & Tool Co	2101	N Davidson St		Charlotte	NC	28205-1827	704-377-2300	3599A	3544D		
1889	Modern Plate Co Inc	2612	18th St		Racine	WI	53403-2305	414-634-6130	3321	3369		
1890	Moheco Products Co	26835	W 7 Mile Rd		Detroit	MI	48240-1906	313-531-5630	3542	3399		
1891	Molalla Pump				Oregon City	OR	97045	503-655-1354	5084G	3599E		
1892	Mold Craft Plastics	151	Freestone Ave		Portland	CT	06480-1641	203-342-1906	3544E			
1893	Mold Engineering & Design	145	Ward Ln		Gainesboro	TN	38562-5969	615-268-9643	3544D			
1894	Mold Engineering Inc	6535	E 82nd St		Indianapolis	IN	46250-4524	317-842-1316	3544E			
1895	Mold Markers Information Network				West Covina	CA	91790	818-851-1949	3544E			
1896	Mold Masters Systems Of Americ	345	Staffrd Way		Rochester	NY	14626	716-225-2630	3544E			
1897	Mold-Craft Inc	2405	Missouri St		Tuscumbia	AL	35674-4746	205-381-7803	3544D			
1898	Monarch Industries	401	N Lowell Ave		Syracuse	NY	13204-2042	315-476-8397	4783	3829C		
1899	Monarch Machine Corp	11642	Washington Blvd		Whittier	CA	90606-2425	310-698-9611	3599A			
1900	Monarch Tool & Mfg Co	66	Clinton Rd		Fairfield	NJ	07004-2910	201-575-1244	3599A			
1901	Mondragon Machine Shop	509	S Brownlee Blvd		Corpus Christi	TX	78401-3123	512-882-7640	3599A			
1902	Mono Steel Rule Die Co	51	Manhasset St		Cranston	RI	02910-1009	401-941-6760	3544D			
1903	Monroe Pattern & Mold	1	Sheridan Ave		Elizabeth	NJ	07208	908-245-0270	3544E			
1904	Montoya Iron Works	910	Koerner Ln		Austin	TX	78721-3326	512-385-3665	3548A			
1905	Moore Industries Inc	535	Rochstrrd		Pittsburgh	PA	15237	412-369-0100	3829			
1906	Moore Precision	11132	Fleetwood St		Sun Valley	CA	91352-2745	818-768-5089	3599A			
1907	Moore Products Co	1110	Montlimar Dr		Mobile	AL	36609-1723	334-343-7600	3829			
1908	Moore Products Co Industrial I		Sumneytown Pike		Spring House	PA	19477	215-646-7400	3829			
1909	Moose Machine Inc		Airport Rd		Statesville	NC	28687	704-872-6054	3599A			
1910	Moraine Mold & Tool Inc	11520	Rockfld Ct		Cincinnati	OH	45246	513-772-5333	3544E	3087	3089	
1911	Morgan Steel Inc	1104	Ocean Dr		Homer	AK	99603-7911	907-235-8174	3354	5051D	5084I	
1912	Morgan Tire Co	3608	Natl Pks Hwy		Carlsbad	NM	88220	505-887-0308	7538	5531C	3559M	
1913	Morgantown Machine & Hydrulics	38	Purple Sage Rd Rks		Green River	WY	82938	307-875-3901	3599E			

1914	Morgood Tools Inc	940	Millstead Way		Rochester	NY	14624-5181	716-436-8828	2819	3541H	3599A	3541
1915	Mc[illegible] Industries Inc		Old Laurens Rd		Clinton	SC	29325	803-833-5969	3365			
1916	Mo[illegible] & Son Hardware	1816	S K St		Tulare	CA	93274-6842	209-686-8665	5075	594[illegible]	[illegible]45	3585
1917	Morris Machine & Tool Co	80	Marshall Ave		Cumberland	RI	02864-6406	401-333-9690	3541			
1918	Morrison Construction Services	1990	Saint St		Richland	WA	99352-2102	509-375-1990	1711	7623	1541	3829
1919	Motion Industries Inc	3440	Needmore Rd		Dayton	OH	45414-4314	513-236-7711	3569	3562		
1920	Motor Parts & Supply Company A	6977	N Academy Blvd		Colorado Springs	CO	80918-1126	719-599-8411	5531	3714		
1921	Motor Supply Co	1320	W Hwy	212	Watertown	SD	57201	605-886-5769	3714	7538U	3599A	
1922	Motor Vehicle License Plate Ag	101	N Main St		Mooresville	NC	28115-2525	704-663-5472	3711			
1923	Mountain High Machining	6420	Hollywood Rd		Magalia	CA	95954-9355	916-873-4486	3599A			
1924	Mountain Industrial Network Inc	152	Old Clyde Rd		Clyde	NC	28721	704-627-3200	5734	7378B	3599E	
1925	Mountain Machine Works	2589	Hotel Rd		Auburn	ME	04210-8822	207-783-6680	3594A	3599A		
1926	Mountain Molding Ltd	14444	I25 Frontage Rd		Mead	CO	80542	970-535-4777	3089			
1927	Mountain State Driling				Midway	WV	25878	304-683-3158	3541C			
1928	Mountain States Indl S	1015	W 1700 S		Salt Lake City	UT	84104-2228	801-972-1166	3599E	5082	7699P	3536
1929	Mountain States Screw Machiine Co	6901	W 117th Ave		Broomfield	CO	80020-2925	303-465-4349	3599A	3451		
1930	Mountaineer Machine & Hydraulics Inc		Brushfork Rd		Bluefield	WV	24701	304-325-8030	3599A			
1931	Msm Stl Fabrctr	9	8th Ave Sw		New Brighton	MN	55112-7704	612-633-8181	1791D	1761		
1932	Mtti Inc	2	Equion Dr		Ashland	MS	38603	601-224-6628	3599A	3544D		
1933	Mueller Machine & Tool Co	5932	Jackson Ave		Saint Louis	MO	63134-2398	314-522-8080	3599A			
1934	Multi Grinding Inc	6877	Miller Dr		Warren	MI	48092-1674	810-268-7388	3541H	3599A		
1935	Multi Precision Detail	2635	Paldan St		Auburn Hills	MI	48326-1825	810-373-3330	3544B			
1936	Multicraft Inc Die Cutting	1110	Fairchild Rd		Winston Salem	NC	27105-4590	910-767-6150	3999L			
1937	Multiplex Manufacturing Co	600	Fowler Ave		Berwick	PA	18603-3307	717-752-4524	3494			
1938	Munn Manufacturing Co	312	County Line Rd		Freeport	MI	49325-9773	616-765-3067	3599A	3469		
1939	Murphys Machine Shop & Weldin	911	Hattiesburg Dr		Magee	MS	39111-4207	601-849-2771	3599A			
1940	Murray Mold & Die Co		Industrial Rd		Murray	KY	42071	502-759-4851	3599A	3544E	3544D	
1941	Murray Steven M Ofc	2515	Charleston Pl		Fort Wayne	IN	46808-1385	219-484-0382	3494	5085H	5063N	3561
1942	Murrys Union 76 Service	516	4th St		Wilmette	IL	60091-2829	708-251-0551	7538	5541	3559M	
1943	Musil Machine & Tool	304	E 2nd St		Grand Island	NE	68801-7712	308-382-7044	3599E	3599A		
1944	Myrick Machine Co	1841	Wright Ave		Jacksonville	FL	32207-6549	904-391-0037	3599A			
1945	N A C-Southern Glass & Plastics Co	110	Echols Ave		Savannah	GA	31406-2528	912-353-7666	5231	5719F	3089	
1946	N C Tool & Die Co	9435	Pineneedle Dr		Painesville	OH	44077	216-354-4152	3599A			
1947	N J C Machine Co	8338	47th St		Lyons	IL	60534-1761	708-442-6004	3599A			
1948	N J Precision Fabricators Inc	199	N12th		Newark	NJ	07100	201-482-9400	3599A	3451		
1949	N K R Precision Mfg Corp		Route	17	Monroe	NY	10950	914-782-8562	3599A			
1950	N R H Engineering	75	Elder St		Milford	CT	06460-6420	203-876-0073	3829			
1951	N R Machine & Welding	884	S Bunker Hill Rd		Colfax	NC	27235-9738	910-993-4411	3599A	7692D		
1952	N Wood Counter Laboratory Inc	1525	E 53rd St		Chicago	IL	60615-4530	312-324-1114	3823			
1953	Naco	1110	W William Cannon Dr		Austin	TX	78745-5460	512-448-4521	1771	1541	3443A	1799B
1954	Nagakura Engineering Works Co Inc	630	S Mapleton St		Columbus	IN	47201-7360	812-375-1382	3542			
1955	Nametric Machinery	285	Sobrante Way		Sunnyvale	CA	94086-4810	408-737-2770	3599A			
1956	Napoleon Manufacturing Inc	123	Nottawasepee		Napoleon	MI	49261	517-536-8656	3566	3541H	3541	3599A
1957	Nardo Fire Equipment	1209	W 26th St		Erie	PA	16508-1519	814-454-1059	3999	5812		
1958	Nashville Steel Rule Die Inc		1416-A Lebanon Pke		Nashville	TN	37210	615-256-5746	3999L	5111	3544D	
1959	National Bushing Parts Co	130	2nd Ave W		Staples	MN	56479	218-894-3940	5531	3714		
1960	National Environmental Products Control Syste	4501	Nw 103rd Ave		Sunrise	FL	33351-7936	305-746-8770	3829			
1961	National Industri Transformer	1314	Ross St		Petaluma	CA	94954-6524	707-763-1108	3829	3625B		
1962	National Machinery Exchange	7805	Paramount Blvd		Pico Rivera	CA	90660-4391	310-949-2446	3599E			
1963	National Transmissions	556	Rosevale Ave		Ronkonkoma	NY	11779-3070	516-585-0632	3699A	4822B		
1964	Nationwide Fire Equip Co	2630	W Larkspur Dr		Phoenix	AZ	85029-2562	602-861-2848	3999	3569E		
1965	Natl Equipment Corp	4248	W 47th St		Chicago	IL	60632-4402	312-376-5400	7629	3542	2064	3559G
1966	Natl Magnetic Sensors Inc	141	Summer St		Plantsville	CT	06479-1156	203-621-6816	3829			
1967	Natl Tractor Parts Inc Crawler Undercarriage S		12127-A Galena Rd		Plano	IL	60545	708-552-7642	3599E			
1968	Nautical Engineering		1790-11th		Oakland	CA	94601	510-839-0902	3731			
1969	Navairas Gilbert Machine	2101	Houston Hwy		Victoria	TX	77901-5734	512-572-8582	3599A			
1970	Navarro Iron Works				Vallejo	CA	94590	707-642-2854	3548A			
1971	Ncl Equipment Specialties	174	S Harrisn		Oswego	IL	60543	708-554-0990	3699C	3829C	5082A	

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1972	N owa Industrial Fasteners Inc	8530	K St		Omaha	NE	68127-1621	402-592-4988	3452	50		
1973	N Clinic	36	California St		Vallejo	CA	94590-2964	707-644-8726	7538C	75		
1974	Nel Ack Sheet Metal Fabricatin	546	Hoyt St		Painesville	OH	44077-3616	216-357-7844	3365	3441		
1975	Nelsen Electric Moto Svc	233	W 3620 S		Salt Lake City	UT	84115-4330	801-262-9530	7694	5932Y	1711B	3599E
1976	Nelson & Son Builders				Northbrook	IL	60062	708-272-6487	3823			
1977	Nelson C Emery Inc	7631	Commerce St		Corcoran	MN	55369	612-420-3844	3564	5074D	5013	3569D
1978	Nes Smith Corp/Die Marker	1410	Clark St		Jacksonville	FL	32206-4626	904-353-6317	3544D			
1979	Nesor Alloy Corp	1	Chapin Rd		Montville	NJ	07045	201-227-2747	3364A	3364		
1980	Net Shapes Inc	1914	S Bon View Ave		Ontario	CA	91761-5546	909-923-1621	3324			
1981	New England Products	84	High St		Danvers	MA	01923-3130	508-774-7779	3599F			
1982	New Era Converting Machinery Inc	235	E 43rd St		Paterson	NJ	07504-1217	201-345-3939	3599F			
1983	New Hampshire Motor Vehicle Di		Rte	16	Berlin	NH	03570	603-752-7502	3711			
1984	New Jersey Gasket Mfg Co		Erial Rd		Blackwood	NJ	08012	609-227-1900	3053	3469		
1985	New Mexico Steel Co	1600	Pacheco St		Santa Fe	NM	87505-3963	505-982-1997	2813	3569	4932	3541
1986	New Stanton Machin & Tool Inc		Rr	11	Greensburg	PA	15601-9811	412-925-6250	3599A			
1987	New Star Brass & Bronze Works	178	Stockholm St		Brooklyn	NY	11237-3704	718-443-0800	5039	3365	3446D	
1988	New Vegas Materials	3379	Industrial Rd		Las Vegas	NV	89109-1907	702-733-6388	3545			
1989	Newcomb Machine & Welding Shop	309	Molly Rd		Hot Springs	AR	71901	501-623-8350	3599A	7692D		
1990	Newform Electronic Co		37b South St		Marcellus	NY	13108-1327	315-673-9165	3699	3679B		
1991	Nicholson Tool & Die	1420	Fields Ave		Columbus	OH	43211-2672	614-299-8500	3599A	3544E	3089	3544D
1992	Nicks Machining	1753	Grant St		Santa Clara	CA	95050-3974	408-748-8534	3599A			
1993	Nicks Well Drilling	6141	Cedar Run Rd		Traverse City	MI	49684-9682	616-947-4857	3599E	1781		
1994	Nicksons Machine Shop Inc	914	W Betteravia Rd		Santa Maria	CA	93455-1194	805-925-2525	3599A	3599E	7692D	7538C
1995	Nightingale Manufacturing	230	Roymar Rd		Oceanside	CA	92054-1323	619-433-2281	3599A			
1996	Nikkel Equipment Co Inc	184	Central Ave		Shafter	CA	93263-2019	805-746-4365	3523	5083	5571	5511B
1997	No Hollywood Die Making & Stamping	7350	Atoll Ave		North Hollywood	CA	91605-4109	818-982-8389	3541			
1998	Nolt Bros Inc Mach Shop	121	Valley View Dr		Ephrata	PA	17522-9775	717-733-8761	3599A			
1999	Non Ferrous Metal Products Inc		Wyandotte Rd		Willow Grove	PA	19090	215-659-2673	3365	1761	3399	3444
2000	Non-Ferrous Fastener Inc	924	N Main St		Orange	CA	92667-5403	714-997-9053	3452			
2001	Norcen Industries Inc		Butteroff Indl Park		Jersey Shore	PA	17723	717-398-4363	3599A	3089		
2002	Nordstrom Valves Inc				Danville	CA	94526	510-743-1736	3494			
2003	Norfolk Machine & Welding Inc Nights Sunday	1019	W 41st St		Norfolk	VA	23500	804-427-9564	3599A	7692D		
2004	North American Products	398	Valley Rd		Gillette	NJ	07933-2110	908-647-7373	3599E			
2005	North Coast Equipment Corp	1271	E 289th St		Wickliffe	OH	44092-2358	216-585-5300	3599E	7389A		
2006	North East Machine & Tool Co		Hwy	218	Janesville	IA	50647	319-987-2003	3599A			
2007	North Hollywood Tool & Mfg Co	12632	Raymer St		North Hollywood	CA	91605-4307	818-983-1201	3469			
2008	North Star Steel-Texas Inc	340	Old Hwy	90	Vidor	TX	77670	409-768-1211	3312			
2009	North Valley Equipment Inc				Grafton	ND	58237	701-352-1833	3523	0134		
2010	Northeast Industrial Tooling I	75	Webster St		Worcester	MA	01603-1932	508-757-8000	3599E			
2011	Northeast Metrology Corp	30	Bermar Park		Rochester	NY	14624-1541	716-426-6440	3599D			
2012	Northeast Tool Corp	850	Saint Paul St		Rochester	NY	14605-1065	716-423-0190	3599A	3441	3544D	
2013	Northeastern Plastics Inc	420	Carroll St		Brooklyn	NY	11215-1085	718-855-1446	3089			
2014	Northern Ky Mach Shop	1004	Mary Laidley Dr		Covington	KY	41017-9527	606-356-3444	3599A			
2015	Northern States Metals	51	N Main St		West Hartford	CT	06107-1926	203-521-6001	5051A	3354		
2016	Northern Surveying Instr				Crivitz	WI	54114	715-854-7224	3829C			
2017	Northland Equipment Co Inc	306	W State St		Janesville	WI	53546-2556	608-754-6608	3711	8322E	3524	5013Z
2018	Northwest Calibration Systems	5700	6th Ave S		Seattle	WA	98108-2510	206-762-2515	3823	3825	3829	3586
2019	Northwest Implement		Hwy 10 West		Orange City	IA	51041	712-737-4874	5511B	3523	5012A	
2020	Northwest Metal Spinning Co	9351	Chestnut Ave		Franklin Park	IL	60131-2933	708-455-5060	1791D			
2021	Northwest Mine Supply	716	Bank St		Wallace	ID	83873-2304	208-752-0022	3541C	5082X		
2022	Northwestern Tool & Die Manufacturing Corp	868	Elty Ave		Vineland	NJ	08360-1687	609-696-9470	3544D			
2023	Norton Co Norton Pike Sivision		Highland Ave		Littleton	NH	03561	603-444-3947	3291			
2024	Norton Precision Machining Inc	1849	Walsh Ave		Santa Clara	CA	95050-2505	408-980-9238	3599A			
2025	Norwood Tool Co	717	N Western Ave		Dayton	OH	45417	513-268-1629	3544D			
2026	Nosala Engineering & Mfrs	7871	Alabama Ave		Canoga Park	CA	91304-6615	818-703-1971	3599A			
2027	Novi Die & Engineering	1485	Temple City Dr		Troy	MI	48084-4607	810-649-1600	3544D			
2028	Nowak Design & Machine Co Inc		Robert Whrtn		Wharton	NJ	07885	201-366-7208	3599A			
2029	Nowling Industrial Fabricators	2314	Boykin Blvd		Mobile	AL	36605-4306	334-478-1021	1791D	2621	3441	5084R

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2030	Nu Con Corporation	34100	Industrial Rd		Livonia	MI	48150-1335	313-525-0770	3599A			
2031	Nu[illegible]c	2424	S Beech Daly		Dearborn	MI	48120	313-563-1560	3364A			
2032	Nuc[illegible] Finish	1601	Omaha Ave		Norfolk	NE	68701-4596	402-644-8600	3399			
2033	Numerical Control Consultants	3865	W Woods Rd		Castle Rock	CO	80104	303-688-6663	3599A			
2034	Nuts Bolts & Nuts	444	W Grand Ave		Chicago	IL	60610-4038	312-527-4220	3452			
2035	O K Fasteners Inc	815	Industrial Dr		Troy	IL	62294-2443	618-452-1030	3452			
2036	O K Machine		40j Corbin Ave		Deer Park	NY	11729	516-243-0771	3599A			
2037	O P S		Highway 29 & Walnut Dr		Oakville	CA	94562	707-944-2471	7359M	5084G	3599E	7629
2038	O R Enterprises	1530	Goodyear Dr		El Paso	TX	79936-6023	915-595-1566	3599E			
2039	O S S International	30777	Northwestern Hwy		Farmington Hills	MI	48334-2512	810-855-9625	3545			
2040	Oakland Pattern & Mold Works	2901	E- 7th St		Oakland	CA	94601	510-535-1122	3999A	3543		
2041	Oberg Arizona Inc	208	S Mckemy Ave		Chandler	AZ	85226-3407	602-961-0622	3544D			
2042	Oberlin Filter Co Div Of Produ	404	Pilot Ct		Waukesha	WI	53188-2439	414-547-4900	3569D	9511B		
2043	Ocean Industries	427	Kelly Ave		Londonderry	NH	03053-2023	603-622-2481	3829			
2044	Ocello Tool & Die	1550	Ocello Dr		Fenton	MO	63026-2479	314-343-4385	3544D			
2045	Ochlochnee Metal Works		Rr	2	Ochlocknee	GA	31773-9802	912-574-5412	3599A	7692D		
2046	Oconnell Harry Machining Co	3116	Sylvan Ave		Dallas	TX	75212-4027	214-747-1492	3599A			
2047	Offenhauser Co	2201	Telephone Rd		Houston	TX	77023-4621	713-928-2981	3365	1791D	1711P	3441
2048	Offshore Marine Consultant Inc	9764	W Bay Harbor Dr		Miami	FL	33154-1721	305-866-2467	3731			
2049	Ohio Cutter Grinding Co	12900	Berea Rd		Cleveland	OH	44111-1626	216-671-3377	3541H			
2050	Ohio Hi-Speed Mach Inc	9940	York Alpha Dr		North Royalton	OH	44133-3510	216-230-0144	3599D			
2051	Ohio Valley Indust	620	Moon Clinton Rd		Coraopolis	PA	15108-3856	412-269-0020	3569			
2052	Ohio Valley Supply And Maintenance				North Olmsted	OH	44070	216-835-3666	3291			
2053	Oklahoma Tax Commission Motor Vehicle Dea	409	Ne	28	Oklahoma City	OK	73105-4215	405-521-2467	3711			
2054	Olhausen Farm Power Inc		S Hwy	75	Luverne	MN	56156	507-283-4439	3523	5261C	5511B	
2055	Olsen Engineering Inc	1100	E Le Claire Rd		Eldridge	IA	52748-1740	319-285-8134	3599A			
2056	Olsen Jay	1022	Road	9	Powell	WY	82435-9225	307-754-5844	3599A	7692D		
2057	Olympic Transmissions Inc	311	W Main St		Bay Shore	NY	11706-8311	516-666-5880	3699A	4822B		
2058	Omaha Valve & Fitting Co	5020	Leavenworth St		Omaha	NE	68106-1429	402-553-8800	3498	3494		
2059	Omc Inc	10035	Tanner Rd		Houston	TX	77041-7551	713-690-3600	3541C			
2060	Omega Casting Corp	129	W 29th St		New York	NY	10001-5105	212-947-6698	3363	3364	3599	
2061	Omega Precision	13040	Telegraph Rd		Santa Fe Springs	CA	90670-4078	310-946-2491	3599A			
2062	Optical Engineering Co Inc	710	Davis Cir		Marietta	GA	30060-3009	770-427-3116	3829C			
2063	Optical Technologies	7323	S 76th Ave		Bridgeview	IL	60455-1107	708-594-0708	3544E			
2064	Optico	5013	Pacific Hwy E		Fife	WA	98424-2658	206-926-1519	3699C	3829C		
2065	Opw Fueling Components-A Dover Co	9393	Princeton Glendale Rd		Hamilton	OH	45011-9707	513-870-3100	3494	1799S		
2066	Orange County Broaching	1592	S Anaheim Blvd		Anaheim	CA	92805-6227	714-776-9761	3541B			
2067	Orange Engine & Parts No 3	33483	Del Obispo		Mission Viejo	CA	92690	714-493-6261	5531A	7538U	3494	
2068	Oregon Pattern & Manufacturing	29250	Meadowvw Rd		Eugene	OR	97404	503-689-7528	3369	3543		
2069	Origen Co	9916	1/4 Rush St		South El Monte	CA	91733-2637	818-579-3580	3599A			
2070	Orion Industries Manufacturing	33926	9th Ave S		Federal Way	WA	98003-6708	206-927-1040	2399	1791D	3399	4783
2071	Osso Frank & Co				Aptos	CA	95003	408-685-3559	3082	3089		
2072	Ostermeyer Hay Equipment		Rr	2	Shelton	NE	68876-9802	308-467-2341	3523	0751		
2073	Othello Iron Works Inc	335	S Broadway Ave		Othello	WA	99344-1349	509-488-3855	3523	3599A	3364A	7692D
2074	Ottawa Parts House	225	S Walnut St		Ottawa	KS	66067-2206	913-242-4040	7538	5531A	3599A	
2075	Otto Tool & Stamping Corp	29	Avenue C		Newark	NJ	07114-2601	201-824-9039	1791D	3469		
2076	Ouachita Machine & Tool Co	71	Acorn Ar		Mena	AR	71953	501-394-1472	3599A			
2077	Ouachita Machine Works	120	Hilton N		Monroe	LA	71207	318-396-1468	3599A			
2078	Oxford Machine Company		Coldwater Industrial Park		Oxford	AL	36203	205-831-3406	3599A			
2079	P & B Precision Products		721- 77th Ave		Oakland	CA	94601	510-569-7500	3599A			
2080	P & L Specialties	6775	Mckinley Ave		Sebastopol	CA	95472-6509	707-829-4811	3535	3599F		
2081	P E T Engineering Lab	16329	Piuma Ave		Cerritos	CA	90703-1587	310-860-8013	3599A			
2082	P G S Inc	2566	Industrial Row Dr		Troy	MI	48084-7035	810-280-1142	3599A			
2083	P K Machine & Tool Inc	5815	Harlem Rd		Sunbury	OH	43074	614-965-2053	3599A			
2084	P M Plus	5870	Obispo Ave		Long Beach	CA	90805-3716	310-633-5017	3599A			
2085	P M T Inc		Hwy 645 S		Harmony	TX	75684	903-729-5587	3599A			
2086	P S A-West	923	N Foster Rd		Casper	WY	82601-1640	307-265-3244	5084A	3724	5032H	
2087	Pac International Inc	5400	Ward Rd		Arvada	CO	80002-1819	303-422-0777	3542			

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2088	P[illegible]hinery Sales Inc	288	Nw 86th Ter		Coral Springs	FL	33071-7446	305-752-7632	3599E			
2089	P[illegible]t Products Inc	8831	Cedar St		Bellflower	CA	90706-6307	310-633-6673	3365			
2090	Pacific Coast Bolt Corp	12744	Florence Ave		Santa Fe Springs	CA	90670-3906	310-944-9549	3452			
2091	Pacific Coast Sales Co	2001	Tyler Ave		South El Monte	CA	91733-3510	818-350-6261	3569			
2092	Pacific Precision Machine	1677	Old County Rd		Belmont	CA	94002-3936	415-591-6334	3599A			
2093	Pacific Space Products Inc		Po Box	878	Marina	CA	93933-0878	408-384-7481	3569H	3089		
2094	Pacific West Coast Dies Inc	1064	Woodland Ave		Modesto	CA	95351-1542	209-526-5830	3544D			
2095	Pageco Tools	130	Salsman St		Lafayette	LA	70506-2112	318-233-4727	5211O	3599A	7359L	1629L
2096	Pagendarm Inc	149	Canterbury Dr		Ramsey	NJ	07446-2508	201-327-1540	3599F			
2097	Paige Inc	10670	Executive Dr		Boise	ID	83713-8934	208-375-5411	3569E	9221		
2098	Pall Corp Scientific & Lab Svc	20217	Avalon St		Saint Clair Shores	MI	48080-3721	810-777-8298	3569			
2099	Palmer Express Paper & Graphics Stores	2201	Taylor St		Houston	TX	77007-2805	713-861-9153	3569	5112	5111	
2100	Palmer Mach Co		West River Rd		Augusta	ME	04330	207-622-5041	3599A	7692D		
2101	Palmer Mfg & Supply Inc	25	N Bechtle Ave		Springfield	OH	45504-2840	513-323-6339	3365			
2102	Palmer Rex Welding & Machine Shop	110	N Main		Stratford	TX	79084	806-396-2034	3599A			
2103	Palmetto Bp	440	8th Ave W		Palmetto	FL	34221-5120	941-722-1055	5541	3559M		
2104	Palmetto Machine Parts	517	Camson Rd		Anderson	SC	29625-1407	803-226-6000	3566	3599A		
2105	Pamco	10640	Elkwood St		Sun Valley	CA	91352-4631	818-768-8968	3599A			
2106	Pannier Corp The	5438	Ashton Ct		Sarasota	FL	34233-3496	941-924-1256	3599A			
2107	Papsco Inc	9217	Midwest Ave		Cleveland	OH	44125-2415	216-475-0800	3498			
2108	Par Industries Inc	305	Lake Rd		Medina	OH	44256-2458	216-273-1118	3469			
2109	Paradis Ray Machine Inc		Ridge Road & Highway 88 West		Jackson	CA	95654	209-223-1576	7538C	3714B	7538U	3599A
2110	Paraflex Machine & Tool	3825	N 39th Ave		Phoenix	AZ	85019-3605	602-272-5673	3599A			
2111	Paraflex Manufacturing	1805	80th St E		Tacoma	WA	98404-5412	206-537-7562	3544E			
2112	Paragon Aircraft Corp	3113	Orlanes East		San Diego	CA	92106	619-222-0484	3721			
2113	Paramount-Crawford Technologies Inc Mach S	1135	Old Greensboro Rd		Kernersville	NC	27284-8429	910-996-2731	3599A			
2114	Park Avenue Products Inc Casting Div	123	9th St Nw		Akron	OH	44314	216-848-5010	3354			
2115	Parker Blasting & Contracting	1050	Merry Fox Farms Rd		Alabaster	AL	35007-8512	205-663-3443	3312	1541	1794	
2116	Parker Hill Associates	4511	W Belmont Ave		Chicago	IL	60641-4542	312-777-2[illegible]11	3829			
2117	Parker Lynn D & Dalene	912	Wood St		Fort Collins	CO	80521-1958	970-484-3743	1541	1794	3599E	3594A
2118	Parker Precision Products Co Inc	32	Bell St		Orange	NJ	07050-1509	201-678-8450	3544D			
2119	Parkersburg Motor Supply	202	4th St		Parkersburg	IA	50665-1024	319-346-2103	5531	3599E		
2120	Parkway Machine & Metal Works	711	Industrial Pky		Saraland	AL	36571-3713	334-675-6360	3599A	7692D		
2121	Parkway Steel Rule Cutting Dies	1432	Link Rd		Bedford	VA	24523-3110	540-586-4948	3544D			
2122	Parkwood Machine Tool Co	4204	Parkwood Ave		Baltimore	MD	21206-5613	410-485-0544	3599A			
2123	Parrish Machine Co Inc	3702	Progress Dr		South Bend	IN	46628-1612	219-234-1051	8711	3599A	3544D	
2124	Parsons Steel Rule Dies Inc	617	S Smallwood St		Baltimore	MD	21223-3378	410-945-4800	3999L			
2125	Pat Murphy Enterprises	2243	Stevens Dr		Richland	WA	99352-1848	509-375-0476	7538C	7538	7538U	3599A
2126	Patco Grinding	14827	Proctor Ave		Industry	CA	91746-3205	818-369-5462	3541H	3599A		
2127	Patterson Inspection Services	539	S Sheldon Rd		Channelview	TX	77530-4253	713-452-5443	1389E	1389K		
2128	Patton Machine		Johnson Rd & Lillian Rd		Williamstown	NJ	08094	609-629-4405	3599A			
2129	Patton Sales Corp	558	E Calif St		Ontario	CA	91761	909-988-6461	3599A	5084D	3498	5051D
2130	Patulak Machine Corp	80	Grove St		Gloucester	MA	01930-2760	508-283-8300	3599A			
2131	Paul & Als Machine Shop	4574	Dyer Blvd		West Palm Beach	FL	33407-1035	407-848-0803	7538C	3599A		
2132	Pauls General Sales	736	West Gate Rd		Baxter	TN	38544	615-858-4865	3545			
2133	Pecks Coating Supply Co	1450	N 27th Ave		Phoenix	AZ	85009-3603	602-269-6279	3291	2952	5198	5082N
2134	Pedersen Brothers Equipment	6170	Highway 90 E		Lake Charles	LA	70615-4707	318-436-2497	3523	5999O	5511B	5013B
2135	Pedko Engineering	1563	W	132d	Gardena	CA	90248	310-532-8392	3089			
2136	Peerless Laser Processors	4353	Directors Blvd		Groveport	OH	43125-9504	614-836-2073	3699C			
2137	Peerless Machine Products Co	1610	New Brighton Blvd		Minneapolis	MN	55413-1643	612-781-0508	1791D			
2138	Pelco Mfg Co Inc	3511	Avalon Blvd		Los Angeles	CA	90011-2494	213-234-9276	3544D	3469		
2139	Pell Engineering & Manufacturi	12	Green St		Woburn	MA	01801-4321	617-933-7184	3599A	3541H		
2140	Penn Machine Of Texas	315	N Wayside Dr		Houston	TX	77020-7514	713-679-7900	3498			
2141	Penn Plastics Inc	381	Bishop Ave		Bridgeport	CT	06610-3025	203-334-2673	3544E	3089		
2142	Penn Tex Industrie	206	E Dallas St		Mansfield	TX	76063-3150	817-477-4226	3451			
2143	Penna Alloy Machining Co Inc		Freeport & Guyasula		Pittsburgh	PA	15123	412-781-5890	3599A			
2144	Penna Hardware Manufacturing Co	147	W Penna Ave		Malvern	PA	19355	610-644-1650	3469			
2145	Pent Plastics	303	E 4th		Avilla	IN	46710	219-897-3775	3089			

2146	Peoria Manufacturing Inc	17620	Duvan Dr		Tinley Park	IL	60477-3667	708-429-4200	3599A			
2147	Pr[illegible]elding Machin Inc		Zachariah Rd		Beattyville	KY	41311	606-464-3697	3599A			
2148	Pe[illegible]ool Co	1025	Lavern Cir		Hendersonville	TN	37075	615-824-4341	3544D			
2149	Perforated Metals Plus Inc	243	W 8th St		West Wyoming	PA	18644-1609	717-693-2544	30893			
2150	Performance Sprots Inc	64	N Hwy	20	Ashton	ID	83420	208-652-7738	3711	5551	5571	7699Y
2151	Perkasie Industries Corp		Spruc & Constitutn Avs		Perkasie	PA	18944	215-257-6581	3082	3089		
2152	Perri Machine	25	New York Ave		Rochester	PA	15074-1938	412-774-4141	3599A			
2153	Perry Industrial Equipment And Supplies	101	Dyer St		Columbia	TN	38401-4558	615-388-9773	7359E	3569	5051Z	5085H
2154	Perryville Steel Products Co		Hwy 61 S		Perryville	MO	63775	314-547-2541	3599A	5051D	5084I	
2155	Peru Tool & Engineering Inc	360	Harrison Ave		Peru	IN	46970-1158	317-473-4221	3599A	3469		
2156	Peterson Fiberglas Laminate	300	Stariha Dr		Shell Lake	WI	54871	715-468-2306	3089			
2157	Peterson Welding	2603	E Boyd Ave		Gallup	NM	87375	505-863-2033	3599A	7538A	7692D	
2158	Peterson-Kruse Inc	907	23rd St		Rockford	IL	61108-3596	815-397-9755	3541	3559	3599	5065
2159	Petersville Machine Shop	3634	Cloverdale Rd		Florence	AL	35633-1304	205-760-9661	7538C			
2160	Petes Auto Parts		N Hwy	83	Roma	TX	78584	210-849-2075	3559M			
2161	Petes Automotive Machine Shop	1107	72nd N Bgn		Union City	NJ	07087	201-662-9718	7538C	3599A		
2162	Petes Road Service Inc	18620	Compton Ave		Corona	CA	91719-3305	909-737-4024	5084E	5531	7534	3559M
2163	Petro-Syn Instrument Service	3195	Park Rd		Benicia	CA	94510-1185	707-746-6001	3829			
2164	Petroleum Accessories Inc	11261	Richmond Ave		Houston	TX	77082-2676	713-589-9337	3494			
2165	Peyton Chassis & Components In	3109	Little Rd		Arlington	TX	76016-1730	817-429-2001	5531E	3711	5531	
2166	Philips Hydraulic Services	13315	Vet Mem Blvd		Houston	TX	77014	713-583-5426	3599E			
2167	Phillips B E Co Mach Shop	7247	Atoll Ave		North Hollywood	CA	91605-4105	818-764-3133	3451			
2168	Phillips Bros Machine Co Inc	2234	Mcfarland Ave		Rossville	GA	30741-4528	706-861-4360	3599A	3599F	7692D	
2169	Phillips Casting Inc	90	E Church Ln		Philadelphia	PA	19144-2292	215-848-5631	3363	3364	3599	
2170	Phillips Machine Shop		Rr	2	Florala	AL	36442-9802	334-858-6113	7538C			
2171	Phils Pump Service		Rr	1	Shohola	PA	18458-9801	717-296-8411	1711A	3561	3599E	4941
2172	Phoenix Motor Parts	535	W Redlands Blvd		Redlands	CA	92373-4637	909-793-2168	7538C	5531	5084I	5531A
2173	Photoreceptor Systems	1480	Nw 94th Ave		Miami	FL	33010	305-591-7107	3699C	7334	5044H	7389G
2174	Picker Internationai	870	Lively Blvd		Wood Dale	IL	60191-2686	708-595-7900	3523			
2175	Pierson Ben Centerless Grinding		Rr 2 Box	250-A	Seneca	MO	64865-9802	417-776-2708	3599A	3541H		
2176	Pilgrim Screw Corp	1430	W 12th Pl		Tempe	AZ	85281-5214	602-967-8788	3452			
2177	Pinto Machine	986	Oliver St		North Tonawanda	NY	14120-3243	716-694-7448	3599A			
2178	Pioneer Grinding & Mfg Co	10009	Franklin Ave		Franklin Park	IL	60131-1817	708-678-6565	3541H	7699P		
2179	Pioneer Machine Shop	574	Sugar Creek Rd		Union	SC	29379	803-429-8159	3599A			
2180	Pioneer Pipe Inc	105	N Jamestown Rd		Coraopolis	PA	15108-1014	412-262-9050	3569			
2181	Pioneer Valley Fastener & S	31	Woodside Dr		Longmeadow	MA	01106-2039	413-567-5388	5072	5085	3452	
2182	Pipe Fab	2007	Jeffersonville Rd		Macon	GA	31201-4514	912-742-4737	3498			
2183	Pipe Products Inc	401	S Haven St		Baltimore	MD	21224-2606	410-732-9300	3569	3498	3541F	3494
2184	Piping Supplies Inc	4758	Hammermill Rd		Tucker	GA	30084-6658	770-414-6503	3494			
2185	Pisgah Industries Inc	302	N Main St		Columbia City	IN	46725-1741	219-244-6270	3569			
2186	Pittsburgh Industrial Corp		Hammond & Gregg		Carnegie	PA	15106	412-276-1392	3599E			
2187	Pj Tool Co	36	Front St		Dayton	OH	45402-1329	513-224-4159	3544D			
2188	Plan B Industries-Shop Location	3545	Nw 10th Ave		Oakland Park	FL	33309-5901	305-563-9977	3599A			
2189	Plank Company The	2655	Lombardy Ln		Dallas	TX	75220-2530	214-357-4369	5082A	7359M	4932	3699C
2190	Planters Equipment Co		Hwy 61 N		Cleveland	MS	38733	601-843-2741	3523	5511B		
2191	Plascap Corp Plastic Closiers	7721	Deering Ave		Canoga Park	CA	91304-5653	818-992-3341	3089	3085		
2192	Plastex Fabricators Of Char	318	Remount Rd		Charlotte	NC	28203-5091	704-375-8589	2599A	3087	3089	2759A
2193	Plastic Design Inc	125	Muller Rd		Burlington	MA	01803-5198	617-862-4800	3087	3089		
2194	Plastic Goods Co	6340	Knox Industrial Dr		Saint Louis	MO	63139-3025	314-644-5120	3089			
2195	Plastic Mold Technology Inc	4201	Broadmoor Ave Se		Grand Rapids	MI	49512-3934	616-698-9810	3599K	3544E	3089	3493
2196	Plastic Sales	3124	Gillham Plz		Kansas City	MO	64109-1710	816-561-7050	3081	3089		
2197	Plastic Structures Co	2462	S Union Ave		Bakersfield	CA	93307-5007	805-323-2921	3443A	5084R		
2198	Plastics Plus Technology	4247	E Airprt Dr		Ontario	CA	91758	909-395-8400	3599A	3089		
2199	Plastronic Engineering Co	35	Walnut St		Haverhill	MA	01830-5605	508-372-7703	3089			
2200	Plattner Welding Supplies Inc	1723	S Santa Fe St		Chanu[illegible]	KS	66720-3224	316-431-0520	7382A	3569	5084I	
2201	Pohang Iron & Steel	21515	Hawthorne Blvd		Torra[illegible]	CA	90503-6501	310-540-2966	3312			
2202	Pohlman Inc	140	Long Rd		Che[illegible]ld	MO	63005-1206	314-537-1909	3451			
2203	Pokorney Mfg Co	10148	Pacific Ave		Fran[illegible] Park	IL	60131-1647	708-678-8932	3494			

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]		[redacted]	[redacted]	[redacted]	[redacted]	57201	[redacted]	3523			
2205	P[illegible]echnology Corp	70	Carlisle Pl		Stamford	CT	06902-7630	203-327-6010	3089			
2206	Pontes[illegible]ell Auto Care	2530	Concord Pike		Wilmington	DE	19803-5003	302-478-9786	7538	5541	3559M	
2207	Pontiac Seed House & Flower	743	W Howard St		Pontiac	IL	61764-1601	815-844-5013	3999D			
2208	Pope Engineering & Testing Laboratories	2463	Eslava Creek Pky		Mobile	AL	36606-2034	334-471-3458	3541C	8748L	8711G	8641C
2209	Poplar Bluff Steel & Fabrication		Old Highway 60 E		Poplar Bluff	MO	63901	314-686-2118	3599A	1791D	5051D	3441
2210	Popp Machine & Tool Inc	1463	S Brook St		Louisville	KY	40208-2055	502-635-5259	3599A			
2211	Portland Precision Instrument	1111	Se Pine St		Portland	OR	97214-1382	503-231-1576	7353	3699C	7359	3829C
2212	Positive Plastic Cards	432	E Francis Ave		Ambler	PA	19002-3406	215-641-0430	6141	3089		
2213	Post Supply Co Inc Plumbing Su	1015	Edgewater Ave		Ridgefield	NJ	07657-2308	201-945-5040	3494			
2214	Post-Tension Foundation Service	3020	Hollywood Ave		Shreveport	LA	71108-3843	318-636-6161	1771	5051H	3541C	
2215	Potestio Brothers	19020	Longs Way		Parker	CO	80134-9064	303-841-2299	7699P	3523	1799A	5261C
2216	Power Drive Components Inc	40	Newtown Plz		Plainview	NY	11803-4506	516-694-2740	3541			
2217	Power Drives-Rochester Corp	640	N Winton Rd		Rochester	NY	14609	716-654-6770	3494	5085H		
2218	Pratt Automotive	412	Arrawanna St		Colorado Springs	CO	80909-6205	719-475-0896	7538C	7538	3599A	
2219	Praw Industrial Marketing	2820	San Bernardo Ave		Laredo	TX	78040-3500	210-791-8036	3569			
2220	Prazak Willie Water Well	2502	Nelga Rd		Wharton	TX	77488-5810	409-532-4217	1781	3599E		
2221	Preceptor Aircraft	1232	Shepherd St		Hendersonville	NC	28792-6437	704-697-8284	3721			
2222	Precies Products Corp	1302	Bixby Rd		Kalamazoo	MI	49001-1616	616-345-5379	3599A			
2223	Precise Engineering	683	Lincoln Lk Rd Se		Lowell	MI	49331	616-897-8977	3544D	3599K	3544E	
2224	Precise Machine Co	1706	Main St		Agawam	MA	01001-2513	413-789-1923	3599A			
2225	Precise Products Co	21	Lower Rd		Lincoln	RI	02865-1898	401-724-7190	3599K	3469		
2226	Precision & Commercial Tooling	4343	E 56th St		Maywood	CA	90270-2805	213-560-2565	3599D			
2227	Precision Cut Off Service	625	Emmett St		Bristol	CT	06010-7792	203-582-7521	3599A	3541		
2228	Precision Die & Mold Corp Inst		N59 W 14418 Bobolink Ave		Menomonee Falls	WI	53051	414-252-4709	3544E			
2229	Precision Drilling & Tapping Co	505	E Alosta Ave		Glendora	CA	91740-3506	818-963-0331	3541C	3599A		
2230	Precision Electronic Services		949-A Alton Pkwy		Birmingham	AL	35206	205-833-4225	5063A	5063E	3569E	3669
2231	Precision Engine	1764	9th Ave N		Saint Petersburg	FL	33713-7116	813-821-4179	7538C			
2232	Precision Foundations	1259	W Ridge Rd		Gainesville	GA	30501-6933	770-536-9210	1771	1771E	3494	3594A
2233	Precision Frame	3411	K St		Bakersfield	CA	93301-1614	805-324-0877	7538	7539A	3559M	
2234	Precision Grinding Corp	6717	Saint Clair Ave		Cleveland	OH	44103-1743	216-391-7294	3291A			
2235	Precision Grinding Inc	2225	E Franklin Ave		Minneapolis	MN	55404-2291	612-333-0900	3541H	3599A		
2236	Precision Grndng & Mach Cor	11246	S Post Oak Rd		Houston	TX	77035-5745	713-723-7200	3541H			
2237	Precision Industries Inc	7978	S Chotaw Dr		Baton Rouge	LA	70800	504-924-5353	3599A	3441		
2238	Precision Industries Inc Mach Shop	40	Greenwood Ln		Springboro	OH	45066-3033	513-433-3311	3599A			
2239	Precision Machine	23801	Al Hwy	9	Piedmont	AL	36272-6643	205-447-8461	1791D			
2240	Precision Machine & Repair	116	N Highway	33	Rexburg	ID	83440-3518	208-356-0922	3714B	3599E	3599A	7539J
2241	Precision Machine Component In	6635	W Irving Park Rd		Chicago	IL	60634-2410	312-286-3868	3451			
2242	Precision Machine Products Corp	408	Sterling St		Jackson	TN	38301-5828	901-423-9031	3599A	3599F		
2243	Precision Machining & Welding	21	1st St		Montgomery	AL	36108-1101	334-262-8966	3599A			
2244	Precision Measurement Supply	7050	Snowflake Dr		San Antonio	TX	78238-1248	210-681-2405	3599A			
2245	Precision Metalcraft Mach Shop	3694	Se Dixie Hwy		Stuart	FL	34997-5247	407-286-1694	3599A	1791D	3469	3999A
2246	Precision Mold & Machine	11318	S Alameda		Lynwood	CA	90262	310-764-2882	3599A	3544E		
2247	Precision Mold & Tool Inc	2780	N Bermuda Ave		Kissimmee	FL	34741-1222	407-847-5687	3544E			
2248	Precision Pattern Inc	2620	E G St		Tacoma	WA	98421-1998	206-572-4333	3544E	3543		
2249	Precision Plastic Mold Eng	13050	Tom White Way		Norwalk	CA	90650-4547	310-802-0083	3544E			
2250	Precision Prototypes	2820	Columbus Pky		Opelika	AL	36801-8352	334-745-2991	3599A	8731B	3544D	
2251	Precision Pump Company		Po Box	15213	Santa Rosa	CA	95402-7213	707-542-1128	5084G	3599E		
2252	Precision Scraping & Alignment Inc		N2194 Weyers Rd		Kaukauna	WI	54130-9404	414-788-3872	3599D	3599E		
2253	Precision Services Inc	308	Colfax Ave		Clifton	NJ	07013-1794	201-773-5333	3599D	2431		
2254	Precision Swage Inc	21467	Main St		Maplewood	OH	45340	513-596-6951	3599A			
2255	Precision Tool & Die	8869	Balboa Ave		San Diego	CA	92123-1535	619-278-0950	3599A			
2256	Precision Tool & Die Mfg Inc	2766	Bay Rd		Redwood City	CA	94063-3502	415-365-3270	3544D	3599A		
2257	Precision Tool & Engineerin	2820	Elm St		Dubuque	IA	52001-1956	319-557-8661	3544D			
2258	Precision Tools Service Inc	2396	Norcross Dr		Columbus	IN	47201-8844	812-342-1234	3569			
2259	Precision Weight Scale Co	33	Highvw Rd		Sellersville	PA	18960	215-723-9523	3596	3569H		
2260	Precision West Tool & Mfg	8171	Alpine Ave		Sacramento	CA	95826-4725	916-451-1116	3469			
2261	Precision Wire Edm Service	4045	Remembrance Rd Nw		Grand Rapids	MI	49504-1109	616-453-4360	3544D	3599K	3599A	3544E

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2372	R G K Distributors											
2373	R Hahn Machine Sales	11665	Sheldon St		Vero Beach	FL	32960-5572	407-778-7784	3544D			
2374	R Han[illegible]ool & Die Co	1902	Wilbur Ave		Galesburg	IL	61401-5652	309-343-7575	7538	3714B		
2375	R J F[illegible]tions Inc	1050	Emery St		Vidor	TX	77662-270	409-769-5508	3561	3443	7629	1623A
2376	R L Richardson & Associates	370	Evangeline Dr		Philadelphia	PA	19124	215-533-2847	3823	3825	829	3586
2377	R M C Calibration Services											

					Middletown	CT	06457-1856	203-343-5111	3316			
	[illegible]	405	N Berrien St		Albion	MI	49224-1866	517-629-4433	3599A			
2271	Prime Fastener Corp	285	Knickerbocker Ave		Bohemia	NY	11716-3103	516-563-1700	3452			
2272	Prioli Gene Electric Arc Speci	24311	Rochelle St		Laguna Niguel	CA	92656-4033	714-831-8025	3312			
2273	Private Label Chemicals Inc	601	2nd St Se		Minneapolis	MN	55414-2106	612-378-1755	2899	3291	5087E	2841
2274	Pro Fab	1134	Aster Ave		Sunnyvale	CA	94086-6878	408-248-6701	3599A			
2275	Pro Fab Machine Inc	1952	County Road J		Baldwin	WI	54002-5107	715-684-2266	3599A			
2276	Pro-Gram Engineering Corp	475	5th St Ne		Akron	OH	44314	216-745-1004	3599A			
2277	Pro-Mac Machine Corp		Rr	1	Edinburg	PA	16116-9801	412-658-9895	3599A			
2278	Pro-Pellers	34111	Wash Ave		Burlington	WI	53105	414-534-4440	5551	3724		
2279	Pro-Tech Inc	300	Commercial Dr		Columbus	WI	53925-1085	414-623-3566	3599F			
2280	Process Equipment & Supplies	12343	Stark Rd		Livonia	MI	48150-1544	313-261-8080	3569D			
2281	Process Equipment Inc	4900	Wallace Neel Rd		Charlotte	NC	28208-8620	704-398-2222	3569D	3569	3531A	5084G
2282	Process Specialties Inc	339	Millard Farmer Industria Blvd		Newnan	GA	30264	770-253-8454	3569			
2283	Productigear Inc	1900	W 34th St		Chicago	IL	60608-6894	312-847-4505	3566	3599A		
2284	Production Automation Inc	2558	Seaboard Ave		San Jose	CA	95131-1026	408-894-9064	3825B			
2285	Production Components Clark Co Inc	4400	Anaheim Ave Ne		Albuquerque	NM	87113-1663	505-821-3300	3599A			
2286	Production Fasteners Inc	14300	Puritan St		Detroit	MI	48227-2997	313-838-8900	3452	5085G		
2287	Production Machining Co	4850	N 13th St		Terre Haute	IN	47805-1600	812-466-2885	3599A			
2288	Production Macht Tool Co	5508	Fair Ln		Cincinnati	OH	45227-3475	513-271-0880	3599A			
2289	Production Metal Forming In	2625	Greensprings Dr		Klamath Falls	OR	97601-5640	503-882-9088	3542			
2290	Production Sales And Engineering Co	1428	Franklin St		Columbus	IN	47201-5716	812-372-1198	3541			
2291	Productivity Inc	5511	6th St Sw		Cedar Rapids	IA	52404-4813	319-366-5777	3541	3599D		
2292	Professional Service Industries Inc	532	Jefferson St Ne		Albuquerque	NM	87108-1237	505-268-4537	3541C	8711G	8734	8711M
2293	Profix Mfg Company	900	S 5th Ave		Mansfield	TX	76063-2727	817-477-1724	3599A			
2294	Progressive Engineering	29070	Utica Rd		Roseville	MI	48066-4623	810-771-7740	3544D	3541		
2295	Progressive Machine Inc	727	S Oregon Ave		Pasco	WA	99301-4322	509-547-5408	3599A	3441	7692D	
2296	Progressive Machine Works	2	& Walnut		Hamburg	PA	19526	610-562-2281	3599A			
2297	Progressive Steel Rule Die Co	250	North St		Danvers	MA	01923-1205	508-774-6776	3999L			
2298	Progressive Tool & Mfg	315	Bodenhamer St		Kernersville	NC	27284	910-996-1626	3599A			
2299	Promac	3000	Arrowhead Dr		Carson City	NV	89706-0482	702-885-2030	3599A	3544E		
2300	Promex Precision	12067	Foothl Bl		Pacoima	CA	91331	818-897-0300	3599A			
2301	Promotech Inc	161	Enterprise Dr		Ann Arbor	MI	48103-9282	313-761-8060	3089			
2302	Promotional Plastics Inc Mach	4300	10th Ct		Opa Locka	FL	33054	305-681-4883	3599A	3089	3021	
2303	Proper Mold & Engineering Inc	13870	11 Mi Rd		Warren	MI	48089	810-779-8787	3544E			
2304	Protech Tool	6070	Court Street Rd		Syracuse	NY	13206-1711	315-433-0153	3599A			
2305	Protection Professionals				Portland	ME	04101	207-775-5755	5063E	3999		
2306	Proto Machine Co Inc	3650	Golden Triangle Blvd		Keller	TX	76248-4802	817-431-1511	3599A			
2307	Protocast	9732	Cozycroft Ave		Chatsworth	CA	91311-4401	818-882-7848	3324	3365	8731B	3599A
2308	Provast Automation Controls	8920	Activity Rd		San Diego	CA	92126-4458	619-536-7772	3511	3494		
2309	Pruett Manufacturing Co Metl Stmpg		Rr	21	Terre Haute	IN	47802-9801	812-232-1038	3469			
2310	Public Transmission	1710	W Beardsley Ave		Elkhart	IN	46514-1823	219-522-3897	7538	3714	7537	
2311	Puch Manufacturing Corp	1239	Columbia St		Orlando	FL	32805-3834	407-425-3965	3599A			
2312	Puckett Tools & Fasteners Hawkeye Sales Divi	410	1st Ave Nw		Cedar Rapids	IA	52405-3928	319-363-2211	5082	5085	5072E	35[illegible]
2313	Pump & Motor Shop Inc	298	Montrose Rd		Westbury	NY	11590-1734	516-333-4282	3561	3599E	1781	
2314	Pump Control Repair Service				Jupiter	FL	33458	407-744-1931	1711M	3599E		
2315	Purcell Mach Co Inc		Rr	2	Palmyra	PA	17078-9802	717-838-5611	3599A			
2316	Puryear Machine Shop	501	S 18th St		Abilene	TX	79602-4909	915-672-2321	1541A	3599A		
2317	Pv Tool Co	47	New York Ave		Westbury	NY	11590-4908	516-333-8055	3599A			
2318	Pvf Suppliers Inc Weldng Fittings	6634	Lee Hwy		Chattanooga	TN	37421-2454	615-892-8837	3053	3498	5051Z	3494
2319	Px Filtration Inc	1004	Business Pky		Richardson	TX	75081-5023	214-470-9894	3569D			

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
2320	Py[illegible] & Engineering In	3315	Miles Rd Nw		Grand Rapids	MI	49509	616-791-9788	3544D			
2321	Py[illegible]ustries Inc	1422	Irwin Dr		Erie	PA	16505-4816	814-455-7587	3498			
2322	Pyramid Printing	1119	N 1st St		Grand Junction	CO	81501-2175	970-245-7784	3999L	733[illegible]	2759J	
2323	Pyro Service Co	25812	John R Rd		Madison Heights	MI	48071-4099	810-547-2552	3829	3823		
2324	Pyrocom Co	924	N 143rd St		Seattle	WA	98133-6988	206-365-3535	3823			
2325	Q & E	1140	N Kraemer Blvd		Anaheim	CA	92806-1919	714-630-5720	7538C	5013	7538U	7699Y
2326	Q C Plastics				Indianapolis	IN	46219	317-356-9146	3089			
2327	Quad Precision Tool Co	1663	Star Batt Dr		Rochester Hills	MI	48309-3706	810-299-0200	3541H			
2328	Quality Assurance Manufacturing	2431	Impala Dr		Carlsbad	CA	92008-7228	619-931-6550	3599A			
2329	Quality Boring Co	10020	Miller Way		South Gate	CA	90280-5428	310-928-4418	3599A			
2330	Quality Craft Mold	7245	Clark Rd		Paradise	CA	95969-2214	916-872-1072	3544E			
2331	Quality Drive & Steering Inc	6404	Black Horse Pike		Pleasantville	NJ	08232-5542	609-383-9494	5015	3714		
2332	Quality Grinding Co Inc	6240	Bissell Pl		Huntington Park	CA	90255-4598	213-587-7211	3541H			
2333	Quality Indstrl Products Inc	14001	Norby Rd		Grandview	MO	64030-5708	816-765-0445	5083O	7349V	3498	5085R
2334	Quality Machine & Supply Inc P	112	Amedee Rd		Lafayette	LA	70502	318-234-9443	3599A	1629L	3494	
2335	Quality Machine & Tool Fabrica		Hwy 72 W		Abbeville	SC	29620	803-459-9084	3599A			
2336	Quality Machine Shop	2609	E Adams St		Phoenix	AZ	85034-1408	602-225-9786	3599A			
2337	Quality Machine Sthop	3003	Hwy 36 N		Sealy	TX	77474	409-885-6932	3599A			
2338	Quality Machine Works	2804	Se 59th St		Oklahoma City	OK	73129-9308	405-670-2012	3599A			
2339	Quality Machine Works Fax Line		Masters Industrial Park		Salem	MO	65560	314-729-3178	3599A			
2340	Quality Metal Stamping Co	577	Mel Simon Dr		Toledo	OH	43612-4726	419-476-8228	3469	3544D		
2341	Quality Mfg Co	1551	Queen City Ave		Cincinnati	OH	45214-1491	513-921-4500	3599A	3544D		
2342	Quality Mold Co	4511	N Ravenswood Ave		Chicago	IL	60640-5201	312-784-7661	3544E			
2343	Quality Molds	7686	N Bellview Rd		Freeport	IL	61032-9115	815-563-4234	3089	3089		
2344	Quantum Optics		Taft Pond Rd		Woodstock	CT	06281	203-974-6000	3699C			
2345	Quatrotech	15724	W 6th Ave		Golden	CO	80401-5049	303-279-3622	3599A			
2346	Quick Industries Inc		Lincoln Ave		Orwigsburg	PA	17961	717-366-0252	3089	5999		
2347	Quik Kut Distributors		E Hwy	280	Claxton	GA	30417	912-739-2060	3724	5261C		
2348	Quincy Machine & Welding Inc	1226	N 14th St		Quincy	IL	62301-2037	217-223-5464	3599A	5051D	1799	
2349	Quinn Lift				Fresno	CA	93650	209-896-4040	5082A	5084L	3523	3536
2350	Quirk Wire Co		Route	9	West Brookfield	MA	01585	508-867-3155	3357			
2351	R & B	109	Main St		Johnson City	NY	13790-2417	607-770-9814	3599A			
2352	R & E Enterprises0kawasaki Jet Ski	2028	Woodard Rd		Campbell	CA	95009	408-371-8900	5551	3599A		
2353	R & J Corporation				Hayward	WI	54843	715-462-9469	3599A	3544E	3089	
2354	R & J Rule & Die Inc	8016	Santa Fe Springs Rd		Whittier	CA	90606-2716	310-945-7535	3999L			
2355	R & L Electric Motor Repair	933	Meadow St		Chicopee	MA	01013-4826	413-594-9205	5063C	3599E		
2356	R & L Irrigation		S Hwy 27 & Rushville County Rd		Gordon	NE	69343	308-282-2356	1541A	4971	5084G	3599E
2357	R & L Technical Manchine Industrial Supplies	3924	Starlite Dr		Ceres	CA	95307-9766	209-538-8102	3599A			
2358	R & M Oil Field Salvage Inc	116	Santa Anna Ave		Coleman	TX	76834-7410	915-625-2666	7359L	3498		
2359	R & M Transportation Servic	198	W Kingston Springs Rd		Kingston Springs	TN	37082-9102	615-797-4593	3721			
2360	R & R Implement Co	1504	17th St		Brodhead	WI	53520-1664	608-897-2353	3523	5083		
2361	R & R Machine	15831	Chemical Ln		Huntington Beach	CA	92649-1510	714-894-0527	3599A			
2362	R & R Machine Mach Shop		S Main At Dixie		Grant Park	IL	60940	815-465-6741	3599A			
2363	R & R Oilfield Machine	517	Delia Dr		Longview	TX	75601-5902	903-753-6785	3599A			
2364	R & T Auto Parts	205	E Colorado		Holly	CO	81047	719-537-6532	3559M			
2365	R & V Machine	13	Shawnee Trl		Wichita Falls	TX	76303-9601	817-322-9022	3599A	7692D		
2366	R & W Grinding	705	Pine St		Paris	TN	38242-4918	901-644-9855	3541H	3599A		
2367	R A I Inc	4691	Westchesterpke		Newtown Square	PA	19073	610-325-7443	3599D			
2368	R A M Machine Rebuilding Inc		1020a Runnion Ave		Fort Wayne	IN	46808-2567	219-423-6168	3599D	3599E		
2369	R A Serafini Inc				Gastonia	NC	28053	704-864-6763	3089			
2370	R C Barker Engineering	2933	Ne 20th Way		Gainesville	FL	32609-3312	904-378-3715	3599A			
2371	R D B Enterprises-Mr Jaws	27670	Groesbeck Hwy		Roseville	MI	48066-2759	810-775-5454	3569E	5099A		
2372	R G K Distributors	8321	3rd St		Downey	CA	90241-3823	310-869-0527	3599A			
2373	R Hahn Machine Sales	11665	Sheldon St		Sun Valley	CA	91352-1558	818-767-3015	3599E			
2374	R Hans Tool & Die Co	1902	Wilbur Ave		Vero Beach	FL	32960-5572	407-778-7784	3544D			
2375	R J Fabrications Inc	1050	Emery St		Galesburg	IL	61401-5652	309-343-7575	7538	3714B		
2376	R L Richardson & Associates	370	Evangeline Dr		Vidor	TX	77662-2701	409-769-5508	3561	3443A	7629	1623A
2377	R M C Calibration Services				Philadelphia	PA	19124	215-533-2847	3823	3825	3829	3586

2436	R[illegible] R D Drilling Co		S Of Wells		Wells	NV	89835	702-752-3205	3541C	35[illegible]	[illegible]599E	1781
2437	R[illegible]ine Shop & Welding		Po Box		Ringsted	IA	50578-0252	515-866-1481	7538C			
2438	Rhino [illegible]gh Inc		West Milfrod Area		Newfoundland	NJ	07435	201-697-0824	3312	3541C		
2439	Rhodes C	145	School House Rd		Old Saybrook	CT	06475-4045	203-388-0754	1794	3443A		
2440	Rice Assocs	4618	Route	8	Allison Park	PA	15101-2460	412-487-5530	3569			
2441	Richard Tool Die Corp	28600	Grand River Ave		Farmington	MI	48336-5824	810-476-2150	3544D			
2442	Rick Sanford Machine Co	2324	Adeline St		Oakland	CA	94607-2307	510-444-7425	3599A	3544E		
2443	Ricks Manufacturing Co		N Mc Naughton Blvd		Moultrie	GA	31776	912-890-1494	1791D			
2444	Ricks Transmission	1904	Salt Rv		Shepherdsville	KY	40165	502-543-9208	3699A			
2445	Ridenour Fred Longhorn Trailer & Body Co	1141	Sheppard Access Rd		Wichita Falls	TX	76304-2410	817-322-5259	8322E	3714B	3594A	7538B
2446	Rider Plastics Inc	150	W Stratford Ave		Salt Lake City	UT	84115-3031	801-487-2214	3089	3021		
2447	Riehl Henry Inc Machry	4355	Orchard St		Philadelphia	PA	19124-4008	215-288-4969	3599A	3599F	3552	1751B
2448	Riehle Mfg Co Inc	5264	Telegraph Rd		Toledo	OH	43612-3597	419-476-6066	3544D			
2449	Riesen Greg		Rr 4 M		Montello	WI	53949-9804	608-589-5212	3443A	7699H		
2450	Rigamonti Welding Inc	5180	Hanselman Rd		Victoria	TX	77905-5522	512-578-0397	1389B	7692D		
2451	Riggins Engineering Inc	13932	Saticoy		Los Angeles	CA	90028	213-873-7368	3599A			
2452	Rindleys Servistar Hardware	400	S Bringold		Lake George	MI	48633	517-588-2575	5251	7215A	5084G	3599E
2453	Riniker Eugene	950	Western Knolls Ave		Beaumont	CA	92223-1671	909-845-8705	7538C	7538	3599A	7549A
2454	Ripon Manufacturing Co Inc	652	S Stockton Ave		Ripon	CA	95366-2750	209-599-2148	5084E	3599F		
2455	Ritter & Sons	16	E Greenville Dr		Greenville	PA	16125-8501	412-588-5758	3999	3569E		
2456	Riverside Steel Inc	1103	N River Rd		Warren	OH	44483	216-847-7194	3499			
2457	Riverwood International Corpor	280	Midland Ave		Saddle Brook	NJ	07663-6404	201-791-7675	3599F			
2458	Rk Machining & Sheet Metal	599	E Mcglincey Ln		Campbell	CA	95008-4906	408-371-8634	3599A			
2459	Rmc Ripon Manufacturing Co Inc	652	S Stockton Ave		Ripon	CA	95366-2750	209-599-2148	5084E	3599F		
2460	Rmi-D	5590	Joliet St		Denver	CO	80239-2006	303-373-5001	3089	3443A	5084R	
2461	Ro Mo Machine		Barkaboom Rd		Andes	NY	13731	914-586-3361	3599A			
2462	Ro-Mez Machine Works Inc	5939	Waltrip St		Houston	TX	77087-5140	713-644-1313	3599A			
2463	Roberts Machine Works		Ans St		Breaux Bridge	LA	70517	318-332-6245	3599			
2464	Robertson Performance Corp	3950	Ne 5th Ave		Oakland Park	FL	33334-2232	305-564-3969	5013	3711		
2465	Robertson Tool & Engineering Inc	1054	Rig St		Commerce Township	MI	48390-2264	810-624-3838	3541H	3599A		
2466	Robinson Custom Machining Inc	164	Highway	84	Wickes	AR	71973-9408	501-385-7712	3599A			
2467	Robinson Ralph C Co	2430	Grand Ave		Sacramento	CA	95838-4000	916-925-3827	3545			
2468	Robstown Machine Works Inc	601	E Main Ave		Robstown	TX	78380-3130	512-387-2133	3599A			
2469	Rockbridge Casting				Rockbridge	IL	62081	618-753-3188	3363			
2470	Rockford Manufacturing	427	S Rockford Ave		Tulsa	OK	74120-3415	918-592-7866	3599A			
2471	Rocksprings Well Service	1047	Po Box		Rocksprings	TX	78880	210-683-4196	5084G	3599E	1781	8748B
2472	Rockwell Equipmet Co	2178	Hamilton Eaton Rd		Hamilton	OH	45011-9557	513-863-5244	5511B	3523	5261C	
2473	Rocky Mountain Power Equipment Co	84	Allegiance Cir		Evanston	WY	82930-3813	307-789-3365	3599E	3524	5013Z	
2474	Rockys Wire E D M	502	Vandell Way		Campbell	CA	95008-6909	408-370-0339	3599K			
2475	Roco Machine & Supply Second Line		Throckmorton Hwy		Albany	TX	76430	817-762-2039	3599A			
2476	Rodans Craft & Floral	831	Hillcrest Rd		Mobile	AL	36695-3909	334-344-3090	3999D	5945A	5999S	5999R
2477	Roekel Co The	36	S 2nd St		Zanesville	OH	43701-3455	614-452-5421	5075B	3569	3088	5075
2478	Rogers Corp Mach Shop				Dorset	VT	05251	802-867-5949	3599A			
2479	Rogers Gulf	609	Market St		Elmwood Park	NJ	07407-3112	201-791-8887	7538	5541	3559M	
2480	Rogers Tool & Manufacturing	250	Childers Rd		Clay City	KY	40312-9620	606-663-5670	3544D			
2481	Rogers Wheel Alignment & Brake Service		Nc 194 Hwy		Todd	NC	28684	704-265-0980	7539A	3559M		
2482	Rohde Machine Products	1929	Parade St		Erie	PA	16503-2021	814-459-2544	3599A			
2483	Roll Grinding Corp Of America	1380	Echo Lake Rd		Watertown	CT	06795-1634	203-274-9671	3599A	3069B		
2484	Rolled Alloys	2974	Timbrcrst Dr Wstwd		Cincinnati	OH	45211	513-661-5788	3364			
2485	Rolled Alloys Inc	401	Governors Hwy		South Windsor	CT	06074	203-290-5340	3316			
2486	Rolltrusion Inc		Latrobe Industrial Prk		Latrobe	PA	15650	412-539-9770	3089			
2487	Romac Inc	2912	W Columbine		Wichita	KS	67204	316-838-0094	3569D			
2488	Roman Industrial Supl Inc	85	River Rock Dr		Buffalo	NY	14207-2170	716-871-1734	3569			
2489	Ron Bohmfalk Plumbing		Cr	4516	San Antonio	TX	78200	210-931-2679	3443A			
2490	Ron Johnson Steel Engraving In	8330	Pillsbury Ave		Minneapolis	MN	55420-2242	612-881-1155	7373	5944Z	3599A	
2491	Ronco Precision	1101	W Melinda Ln		Phoenix	AZ	85027-2808	602-582-9898	3599A			
2492	Rooks Machine Shop Inc	262	Mcmillan St		Dacula	GA	30211-2337	770-822-5523	7538C			
2493	Roorda Machine Shop Inc	880	10th St		Rock Valley	IA	51247-1530	712-476-2340	3599A			

2494	R[redacted]chine Shop Inc		S Of City		Bowlegs	OK	74830	405-398-4396	3599A		
2495	R[redacted] Inc	1201	Montlimar Dr		Mobile	AL	36609-1718	334-343-9403	3829		
2496	Rosen Supply Co Inc	3405	11th St		Bremerton	WA	98312-2635	360-377-5501	3498	3317	5051Z	5211O
2497	Rosen Supply Co Inc	4910	Lacey Bv Se		Tacoma	WA	98409	206-473-9358	3498		
2498	Ross Controls Inc	1245	S Cleveland Massillon Rd		Akron	OH	44321-1657	216-666-6654	3494		
2499	Rossi Tool & Dies Inc		45d Route	303	Valley Cottage	NY	10989	914-268-5133	8731B	3599A		
2500	Rotating Equipment Repair Inc		W227 N722 Westmound Dr		Waukesha	WI	53186	414-544-9939	3599E			
2501	Rotella J P Co Inc	18	E Barbour St		Haledon	NJ	07508-1524	201-942-2559	3469	1791D		
2502	Rotomatic Engineering	7943	Haskell Ave		Van Nuys	CA	91406-1910	818-994-7768	8711L	3599A		
2503	Royal Mold Company	218	Souderton Rd		Perkasie	PA	18944-2457	215-257-9392	3544E			
2504	Royal Plastics Inc	3133	Highland Blvd		Hudsonville	MI	49426-8808	616-669-3393	3089			
2505	Royal Transmission	45000	Van Dyke Ave		Utica	MI	48317-5576	810-254-1220	3714	7537		
2506	Roys Alignment Serv	2953	W Lawrence Ave		Chicago	IL	60625-3692	312-478-4400	7538	7539A	3559M	
2507	Roys Sewer Service				San Rafael	CA	94911	415-456-2320	1389K	1711A	7699H	3443A
2508	Royson Engineering Co		N Pwnn		Hatboro	PA	19040	215-675-2800	3544D	3599A		
2509	Rozic Tool & Die	38335	Apollo Pky		Willoughby	OH	44094-7762	216-951-3863	3544D			
2510	Rudys Machine Repairs	8054	W 21st Ct		Hialeah	FL	33016-1832	305-556-0040	3599E			
2511	Ruede Products Manufacturin	6666	W Michigan Ave		Jackson	MI	49201-8997	517-750-3344	3599A			
2512	Ruff Mould & Mach Shop Inc	1502	Cincinnati Zanesville Rd Sw		Lancaster	OH	43130-9202	614-681-9911	3599A			
2513	Rullan Wrought Iron Works	4169	N Barcus Ave		Fresno	CA	93722-9163	209-276-2282	3548A			
2514	Russell Machine Co	89	Glendale Rd		West Hartford	CT	06107-1504	203-282-7989	3599A			
2515	Russell Reid Waste Hauling & Disposal Service				Califon	NJ	07830	908-832-2750	7699H	3443A		
2516	Ryder Welding Service Inc	350	Ali Baba Ave		Opa Locka	FL	33054-3815	305-685-6630	1791D	3441	5084R	7692D
2517	S & A Distributing Corp	1	Forbes Rd		Chelsea	MA	02150	617-884-8874	3714			
2518	S & A Industrial Corp	9324	W 54th St		Shawnee Mission	KS	66203-2164	913-362-4749	1791D	3444		
2519	S & A Mfg & Welding	7211	N Pacific Ave		Livingston	CA	95334-9548	209-394-8048	3599A	7692D		
2520	S & A Tuma Inc	22	Community Dr		Cranston	RI	02905-1006	401-467-3245	3999A			
2521	S & Bs Mini Mall	310	Pine Ave		Alma	MI	48801-1813	517-463-3383	3545			
2522	S & S Machine Co		Hwy 5 S		Pleasantville	IA	50225	515-848-3885	3599A			
2523	S & S Machine Co	322	Maple Ave		Franklin	OH	45005-1332	513-746-7403	3599A			
2524	S & S Precision Inc	2403	Industrial Dr		Springfield	TN	37172-5014	615-384-6286	3599A	7699D		
2525	S & S Tool	1310	N Taylor		Grand Rapids	MI	49501	616-458-3219	3599A			
2526	S A E Industries Inc	4571	Patterson Ave Se		Grand Rapids	MI	49512-5304	616-942-1340	0919	3452	5085	
2527	S A Machine Co	36	Baldwin St		East Longmeadow	MA	01028-2232	413-525-2659	3599A			
2528	S M I	43665	Utica Rd		Sterling Heights	MI	48314-2359	810-731-0330	3599F			
2529	S R Die Company	2374	Stone Mtn Lithonia Rd		Lithonia	GA	30058-5248	770-482-7115	3544D			
2530	S R P Polite Welders	210	Sandbar Ferry Rd		Augusta	GA	30901-1850	706-722-3587	3446C	3599A	7692D	
2531	S S S Machinist Co	1777	W Arrow Hwy		Upland	CA	91786	909-946-0898	3599A			
2532	S T I Manufacturing Inc		Hwy 1097 E		Willis	TX	77378	713-363-1019	3829	3823		
2533	S-W Machine Inc	7609	Benbrook Pky		Benbrook	TX	76126-2102	817-249-0095	3599A			
2534	Sabourin Superior Corp	1200	E Kibby St		Lima	OH	45804-3125	419-227-5770	3469			
2535	Sacma Machry Corp	1280	Bassett Rd		Cleveland	OH	44145-1115	216-892-1600	3541			
2536	Saco Brick Co		S Berwick Hwy		Kittery	ME	03904	207-439-9504	3251	3271	5082E	3498
2537	Saco Inc	25047	Highway	22	Mc Kenzie	TN	38201	901-352-5351	3399	3469		
2538	Saf-T Auto Centers	281	E Main St		Meriden	CT	06450-5613	203-237-4311	3559M	7539A		
2539	Safety Line Inc	1731	Toyon Rd		Lafayette	CA	94549-2111	510-932-9995	3545			
2540	Sagittarius Mold Inc	322	Standing Springs Ct		Simpsonville	SC	29680-6236	803-288-9503	3599A	3544E	3544D	
2541	Sai Manufacturing	4204	Auburn Way N		Auburn	WA	98002-1379	206-854-7490	3599A			
2542	Salas E & Sons Machine Shop	1741	E Hwy	83	Mercedes	TX	78570	210-565-5856	7538C			
2543	Salisbury Special Tool		Northwood Bus Center		Salisbury	MD	21802	410-749-2628	3599A	3544D		
2544	Salverson Distributing Co	133	S State St		Fall Creek	WI	54742-9701	715-877-3470	3494			
2545	San Jose Die Casting Corp	2475	Autumnvale Dr		San Jose	CA	95131-1802	408-262-6500	3363			
2546	San-Tec Company Inc	32	Cambridge St		Worcester	MA	01603-2343	508-752-4932	3599A			
2547	Sanar Plastics	1300	East St		Painesville	OH	44077-5573	216-354-6500	3089			
2548	Sarka Sheet Mteal & Fabrica	87	Clinton Ave		Tiffin	OH	44883-1619	419-447-4377	3469			
2549	Saunders Industrial Supl	916	S 10th St		Manitowoc	WI	54220-4508	414-684-5567	5251	3569	3589	
2550	Savage Tool & Mfg Co Inc	1456	E Cliff Rd		Burnsville	MN	55337	612-890-2560	3544B	3599A	3469	3544D
2551	Scan Air Filter Co	100	Beta Dr		Franklin	TN	37064-3912	615-790-2019	3599			

2552	Sch[illegible]ydraulics	21212	Hwy	I-30	Benton	AR	72018	501-794-3156	3599A			
2553	S[illegible]mps & Motors	415	E-5th		Hanford	CA	93231	209-584-3301	5084G	35	41	7389X
2554	Schma[illegible]				Walhalla	ND	58282	701-549-2382	3599A			
2555	Schmidt Tool Manufacturing	76	Finch St		Milford	CT	06460-3042	203-877-8149	3599A			
2556	Schrey & Sons Mold Co	24735	W Avenue Rockefelle		Valencia	CA	91354	805-294-2260	3544E			
2557	Schrods Machine Shop	12	Se Spok		Wilbur	WA	99185	509-647-5352	3599A			
2558	Schuler Tool & Die Fax Number	310	S 2nd		Burr Oak	MI	49030	616-489-2971	3544D			
2559	Schultz Systems	23	Chestnut Dr		South Berwick	ME	03908-2117	207-384-5575	3829	3625A		
2560	Schulz Tool & Machine	1655	E-6th		Corona	CA	91718	909-279-9472	3599A			
2561	Schwabe Herman Inc Die Cutting Machy	147	Prince St		Brooklyn	NY	11201-3022	718-237-1700	3999L			
2562	Schwabel Fabricating Co Inc	349	Sawyer Ave		Tonawanda	NY	14150-7796	716-876-2086	3599A	7692D		
2563	Schwarz Ralph C & Sons Inc	302	N Goodmn		Rochester	NY	14607	716-271-4696	3569D	5084V	3567	
2564	Sclumberger Industries Samgamo Electricity D	4400	Mulhauser Rd		Hamilton	OH	45011-9708	513-860-4808	3699			
2565	Scott Engineerig Co	2216	E Magnolia St		Phoenix	AZ	85034-6817	602-244-0308	3599A			
2566	Sealy Precision Machining Inc		2046-1 Hwy 90 W		Sealy	TX	77474	409-885-2012	3599A			
2567	Seattle Injector Co	1410	Airport Way S		Seattle	WA	98134-1613	206-623-1135	5084L	3569D	5013	
2568	Security Fastener Company				Concord	CA	94520	510-671-0506	3452			
2569	Sedwall Mfg Co Tools	3540	N Ravenswood Ave		Chicago	IL	60657-1088	312-935-0811	3545	3542		
2570	Seeley Machine Inc	49	Glenwood Ave		Glens Falls	NY	12804-2008	518-798-9510	3599A			
2571	Sei	122	Premier Dr		Greenwood	SC	29646-8029	803-223-2665	3599A			
2572	Seibs Welding	2411	W Baseline Rd		Inglefield	IN	47618	812-963-3701	3599A	7692D		
2573	Semco	837	Mineral Springs Rd		Blue Ridge	GA	30513	706-632-8435	3599A	7692D		
2574	Semon Machine Co Inc	315	Pecan Dr		Shreveport	LA	71106-7638	318-797-7464	3599A			
2575	Sems Div Of Textron Inc	29201	Teleraph		Southfield	MI	48034	810-358-4070	3452			
2576	Sendik Alignment & Tire Co	311	Paterson Ave		Wallington	NJ	07057-1920	201-438-1031	3559M			
2577	Sentry Commercial & Indl Supply Co Inc Indstri	1321	E Wallace St		Fort Wayne	IN	46803-2559	219-423-2578	3569			
2578	Sepco Erie	1221	W Robison Rd		Erie	PA	16509	814-864-0311	3599A	3451	3541F	
2579	Sepco Industries Inc	6618	E Highway	332	Freeport	TX	77541-3015	713-233-4491	3562	3494	3568	
2580	Sequoia Saw & Supply Co Inc	204	X St		Eureka	CA	95501-0836	707-445-8888	3291	5251A		
2581	Ser-Pro Inc	309	S Cloverdale St		Seattle	WA	98108-4500	206-767-3100	3544D	3599A	1791D	3544E
2582	Servall Engineering	3941	N Kedzie Ave		Chicago	IL	60618-3415	312-588-7181	3599E	3594A	3569	3569J
2583	Seward Machine & Tool		Rr 2 1 Block West Of S Hwy	15	Seward	NE	68434	402-643-2300	3599A	3544D	7692D	
2584	Seybold Co	107	Northeast Dr		Loveland	OH	45140-7301	513-683-8553	7359A	3569	3589	5085D
2585	Sgrignoli Manufacturing	97	Texacord		Mechanicsburg	PA	17055	717-766-2812	3599A	7692D		
2586	Shaarp Tool & Die	3040	New Tampa Hwy		Lakeland	FL	33801-3469	941-680-3301	3599A			
2587	Shadid Foundry & Manufactur	1100	S Walker Ave		Oklahoma City	OK	73109-1342	405-236-4414	3369	5999E		
2588	Shannon Precision Grinding	6589	Watson St		Union City	GA	30291-1939	770-964-2779	3291A			
2589	Shelton Industrial Pattern Inc	1920	Woodson Rd		Saint Louis	MO	63114-5633	314-423-6365	1791D			
2590	Shinmaywa	1603	Barclay Blvd		Buffalo Grove	IL	60089-4544	708-808-1281	3569	3541		
2591	Shirleys Extras Casting Company		Po Box	2372	Houston	TX	77252-2372	713-586-7993	3363			
2592	Shotts Tool Co	5437	W 34th St		Indianapolis	IN	46224-2224	317-388-9827	3599A			
2593	Shup H B & Son Inc Metl Prodts		Main		Quakertown	PA	18951	215-536-4296	3599A	3469		
2594	Sibo Tool & Die Co	810	Hurlingame Ave		Redwood City	CA	94063-3520	415-365-3965	3544D	3469	3599A	
2595	Siemens Siemens Industrial Automation Inc	2407	Hillsdale Dr		Baton Rouge	LA	70808-2166	504-387-6987	3829			
2596	Sierra Enterprises	3048	W Clarkston Rd		Lake Orion	MI	48362-2052	810-814-9590	3544E			
2597	Sievers Equipment				Hamel	IL	62046	618-633-2622	5999	5261C	3523	
2598	Sigma Engineering Co	8045	Ridgewy Ave		Lincolnwood	IL	60645	708-675-1672	3599A			
2599	Simco Controls	21516	Alexander Rd		Cleveland	OH	44146-5511	216-786-8258	3494			
2600	Simerly Jerry	308	Glenwood Rd		Bristol	TN	37620-5802	615-764-3128	3443A	3272		
2601	Simms Machine & Tool Co	160	11th St		Piscataway	NJ	08854-1952	908-968-3880	3599A	3544D		
2602	Simone Frank	791	Paulison Ave		Clifton	NJ	07011-3608	201-472-4455	7538C			
2603	Simplicity Manufacturing & Engineering	1764	W Clarkston Rd		Lake Orion	MI	48362-2267	810-693-5825	3599A			
2604	Simplicity Unlimited Design Inc	35901	Vickers Dr Ne		Cambridge	MN	55008	612-689-9164	3599A	3599F		
2605	Simplomatic Manufacturing C	816	N Kostner Ave		Chicago	IL	60651-3488	312-342-7757	3469	3089	3541	3544D
2606	Sinnissippi Industries Inc	175	Industrial Ave		Juneau	WI	53039-1276	414-386-2441	3599A			
2607	Skaggs Iron Works Inc Serving		Po Box 13265 2591 Harbor A		Memphis	TN	38101	901-947-3109	3548A			
2608	Skaggs Speciality Machine Co	800	N Main St		Keller	TX	76248-3801	817-431-3596	3599A			
2609	Sko-Die Inc Diemakers	8050	Austin Ave		Morton Grove	IL	60053-3201	708-965-1130	3469			

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2610	Sk Steel Steel Fabrc	1044	Ne 43rd St		Oakland Park	FL	33334-3806	305-561-1912	3365	344[illegible]		
2611	Sl[illegible]neering	13061	Rosecrans Ave		Santa Fe Springs	CA	90670-4930	310-921-3330	3599A			
2612	Slayton [illegible]ernational		Rr 2 Box	[illegible]9	Slayton	MN	56172-9000	507-836-8571	3523	5261[illegible]		
2613	Small Tools Inc	19749	Saint Clair Ave		Cleveland	OH	44117-1097	216-481-9000	3545			
2614	Smco Corporation	513	Shane St		Houston	TX	77037-1423	713-591-8400	1791D			
2615	Smedberg Machine Corp	7934	S South Chgo Ave		Chicago	IL	60617	312-734-3000	3599A	3599D	1796B	3599E
2616	Smith & Harris Machine Co	5170	W 130th St		Cleveland	OH	44142-1899	216-267-3366	3599A			
2617	Smith Automotive Machine Shop	1065	Mills Ln		Frankfort	KY	40601-8953	502-227-8624	7538C	3599A		
2618	Smith Calvin		Rr	1	Eldred	PA	16731-9801	814-225-4441	3999	3569E		
2619	Smith Geo B & Sons	404	Dor Ave S		Boston	MA	02127	617-268-5660	3341	3599A	3599E	7692D
2620	Smith Machine	205	Otero N E		Socorro	NM	87801	505-835-9455	3599A	5051D	5013B	7692D
2621	Smith Machine	42	N 150 W		Lehi	UT	84043-1769	801-768-3000	7538C	7538U		
2622	Smith Machine & Supply Company Inc	817	J R Miller Blvd		Owensboro	KY	42303-3556	502-683-2757	3566	3599A	3441	7692D
2623	Smith Tom Industries	44175	N Groesbeck Hwy		Clinton Township	MI	48036-1179	810-469-9942	3089			
2624	Smith Tool Company Inc	206	Emain		Manasquan	NJ	08736	908-223-5333	3545			
2625	Smith-Mabry Co	3333	Gibson St		Bakersfield	CA	93308-5255	805-325-9443	5084G	3599E		
2626	Smiths Shop				Lebo	KS	66856	316-256-6244	3599	7692		
2627	Smolic Mach Co	37127	Ben Hur Ave		Willoughby	OH	44094-6333	216-946-1747	3599A			
2628	Smt Industries Inc	869	Middle St		Bristol	CT	06010-7445	203-583-0296	3599A			
2629	Smtc Inc	7027	Belgold St		Houston	TX	77066-1020	713-537-7056	3599A			
2630	Snows Mach & Weld Inc	598	Bay Bridge Rd		Prichard	AL	36610-3494	334-457-9692	3599A	7692D		
2631	Sodico		Tolna Rd		Glen Rock	PA	17327	717-235-4804	3363	5099C		
2632	Soini Precision Tool & Die	123	E Main St		Georgetown	MA	01833-2106	508-352-2334	3599A			
2633	Sonoita Machine & Supply	3256	Hwy	82	Sonoita	AZ	85637	520-455-5242	7538C	7538		
2634	Sorenson Design & Development Co	440	W 1000 N		Logan	UT	84321-2244	801-753-1862	3599A	3599F	7692D	
2635	Soro Pete Machine Works Inc	5542	Universal Dr		Memphis	TN	38118-7915	901-360-8957	3544B	3599A	3599D	7692D
2636	Soto Frank H Soto & Sons Die Makers & Die C	1716	S 2nd St		Fresno	CA	93702-4145	209-268-0495	3999L	2759J		
2637	Soule Steam Feed Works	402	19th Ave		Meridian	MS	39301-5203	601-693-1982	3562	3052	3452	3599A
2638	Source Inc Labels	1433	Lafayette Ave		Terre Haute	IN	47804-2632	812-466-7414	2759D	2672	3089	
2639	Source Too Machine Works Shop	6120	N Pedroli Ave		Winnemucca	NV	89446	702-623-9502	3599A	7692D		
2640	South Av Mach Co	14	Enterprise St		Lewiston	ME	04240-3504	207-783-9108	3494	3594A	3569	3599A
2641	South Bay Plastics	20820	Normandie Ave		Torrance	CA.	90502-1601	310-320-8180	8999W	5033	3087	3089
2642	South Bend Form Tool Co Inc	408	W Indiana Ave		South Bend	IN	46613-2093	219-289-2441	8731B	3599A	3544D	
2643	South Coast Portable	13820	Slover Ave		Fontana	CA	92337-7037	909-350-3444	5084L	3599A		
2644	South Eastern Machining Inc		Highway 29 N		Pelzer	SC	29669	803-947-6875	3599A	3451		
2645	South Park Industrial Service Inc	740	S Monroe St		Seattle	WA	98108-4351	206-762-4371	7359A	3599D	3679C	
2646	South-Side Machine Machine Shop Inc	2112	Wayne Sullivan Dr		Paducah	KY	42003-1469	502-442-6107	7389D	3599A	3599E	7692D
2647	Southeast Aluminum Inc	4436	Independence Ct		Sarasota	FL	34234-4727	941-355-0197	3354	1761D	5211H	5091A
2648	Southeast Valve Inc	12201	Nations Ford R D		Pineville	NC	28134	704-588-0973	3829	3494		
2649	Southeastern Enterprises	3208	Benard Ave		Charlotte	NC	28206-2741	704-373-1750	3599A			
2650	Southeastern Municipal Supply	16125	Tamiami Trl		Punta Gorda	FL	33955-7102	941-637-0515	3498			
2651	Southern Controls	3511	Wetumpka Hwy		Montgomery	AL	36110-2735	334-277-5030	3829			
2652	Southern Die Casting & Engineering	1800	Albertson Rd		High Point	NC	27260-8206	910-882-0186	3363			
2653	Southern Fasteners Automotive Support Group	304	Deer Creek Rd		Greenville	MS	38703	601-378-3453	3452			
2654	Southern Machine Specialist	10445	Old Atlanta Hwy		Covington	GA	30209-9503	770-784-5266	3599A			
2655	Southern Metal Fabrications	230	Rutledge Rd		Arden	NC	28704	704-687-2804	1791D	7692D		
2656	Southern Plains Power	3250	North Fwy		Fort Worth	TX	76106-6528	817-624-2107	3621	3511	5084L	3494
2657	Southern Pump And Tank Co	1680	Lowery St		Winston Salem	NC	27101-5603	910-723-1683	3829	5084G	3599E	1799S
2658	Southern Sheet Metal Works	1225	E 2nd St		Tulsa	OK	74120-2009	918-584-3371	2842	1791D	1761	
2659	Southern Specialties Corp	1232	E 2nd St		Tulsa	OK	74120-2018	918-584-3553	3599A	1791D	3469	1761
2660	Southern Steel Rule Dies	1911	S Great Southwest Pky		Grand Prairie	TX	75051-3506	214-660-3985	3544D			
2661	Southern Steel Rule Dies	5429	Allen St		Houston	TX	77007-4311	713-802-2565	3544D			
2662	Southern Tier Hydraulic Jack	144	Swan Hill Rd		Whitney Point	NY	13862-2716	607-692-4773	3599E	1799F		
2663	Southern Tool & Die Inc	2802	Commerce Dr		Jonesboro	AR	72401-9180	501-932-2350	3599A	3544D		
2664	Southern Tool & Equipment Co	1260	Rocky Hill Rd		Knoxville	TN	37919-8091	615-531-8511	3569	3541	3599E	
2665	Southington Tool & Manufacturi	300	Atwater		Southington	CT	06489	203-276-0021	3495	3496A		
2666	Southlake Machine Corp	1231	Birch Dr		Schererville	IN	46375-1335	219-322-5560	3599A			
2667	Souths Machine Shop		W Main		Norris City	IL	62869	618-378-3333	7538C			

2668	Sc[illegible]side Equipment Sales		Bellemont-Alamance Rd		Burlington	NC	27216	910-228-7344	3523			
2669	S[illegible] Bearing Co	809	E Mc Gaffey St		Roswell	NM	88201	505-623-2300	3562	37	992	5531A
2670	Soutn[illegible] Bronze Inc		Po Box	91	Yucca Valley	CA	92286-1491	619-364-4409	3365			
2671	Southwest Die & Automation	11394	James Watt Dr		El Paso	TX	79936-6436	915-590-2444	3544D			
2672	Southwest Industrial Service I	2413	Whitmore St		Fort Worth	TX	76107-1443	817-332-6481	3541H	7699O	3599A	
2673	Southwest Precision Machine	1210	W Alameda Dr		Tempe	AZ	85282-3330	602-968-2801	2399	3599A		
2674	Southwest Saw Co Ans Serv Loc	7145	Lowell Blvd		Westminster	CO	80030-5324	303-429-6487	3599			
2675	Southwest Stainless	2331	Varkel Way		Lithonia	GA	30058-4623	770-482-5611	3498	5085H	3494	
2676	Southwest Tire Molds Inc	523	N Oats St		Texarkana	AR	75502-5819	501-772-6983	5944Z	3599A	3544E	5082N
2677	Southwestern Industrial Fasteners Inc	924	Tony Lama St		El Paso	TX	79915-1305	915-592-5859	3291	3452	3991	3545
2678	Southwestern Industries Inc				Dallas	TX	75200	214-350-0280	3829			
2679	Sparro Machine Products	382	Post Rd		Westerly	RI	02891-2633	401-322-1602	3599A			
2680	Spartan Die Co	2443	S Rundle Ave		Lansing	MI	48910-2796	517-485-0260	3544D			
2681	Spatco Inc	1680	Lowery St		Winston Salem	NC	27101-5603	910-723-1683	3829	5084G	3599E	1799S
2682	Spath Construction Company Inc	5	Dusty La		Newtown	CT	06470	203-270-1310	1541	3443A		
2683	Special T Shop Mfg	416	E 3rd		Lafayette	OR	97127	503-864-3775	3599A			
2684	Speciality Extrusion Equipment Inc	245	W Roosevelt Rd		West Chicago	IL	60185-3739	708-293-5440	3829			
2685	Specialty Machine & Supply Inc	200	Apollo Rd		Lafayette	LA	70501	318-232-2207	3599A			
2686	Specialty Parts Inc Hydrlc Eqp	4145	Whidden Blvd		Port Charlotte	FL	33980-8411	941-625-3455	5531	3562	3714B	3594A
2687	Specialty Pump & Well Services				Bothell	WA	98011	206-487-0123	3599E			
2688	Specialty Screw Corp	2510	N County Rd	427	Longwood	FL	32750	407-339-0988	3599A			
2689	Spectra-Physics Laserplane Nor-Cal	9358	Midway Rd		Durham	CA	95938-9785	916-899-8080	3699C	3829C	5082A	
2690	Spectrum Cad-Cam	810	E Main St		Ontario	CA	91761-1859	909-988-4450	3599E	3541		
2691	Spectrum Environmental	28109	Charley Watts Rd		Livingston	LA	70754-2514	504-686-1003	8711M	3569		
2692	Spectrum Services	12871	Industrial Park Dr		South Bend	IN	46637	219-272-7605	3599D	7349	3599E	
2693	Speicial Mfg	7811	N Alpine Rd		Rockford	IL	61100	815-633-5146	3599A			
2694	Spindle Sales & Service Inc				Bellville	TX	77418	409-865-8804	3541C	7359L		
2695	Spoons Machine Works	920	W Commerce St		Dallas	TX	75208-1741	214-748-1258	3599A			
2696	Spring Sidney Co Inc	1019	E 4th Pl		Los Angeles	CA	90013-2203	213-626-1233	3544			
2697	Springdale Machine & Gear Co Inc	21	Temple St		Holyoke	MA	01040-3423	413-536-2976	3566	3541H	3599A	
2698	Springfeld Tool & Die	85290	Nestle Way		Pleasant Hill	OR	97455-9719	503-747-9735	3544D	3469		
2699	Springfield Foundry Co	1060	River Rd W		Battle Creek	MI	49015-1195	616-962-6278	3364	3369		
2700	Square D Co	1960	Research Dr		Troy	MI	48083-2163	810-680-4444	3699			
2701	Squibb Machine & Tool Inc	4200	Kesslrsvle Rd		Easton	PA	18043	610-258-0923	3599A			
2702	Squires Machine	2105	196th St Sw		Lynnwood	WA	98036-7005	206-775-8856	3599A			
2703	Stabilized Materials Co-Blasting Division	20322	Hufsmith-Kohrville Rd		Tomball	TX	77375	713-379-4402	3312			
2704	Stainless Equipment Inc	5635	Thompson Bridge Rd		Murrayville	GA	30564-1209	770-287-7209	3556	3599A		
2705	Stamm Diesel & Machine	3450	12th St		Wayland	MI	49348-9545	616-459-0941	7538U	3599A	7539F	
2706	Stamm Equipment Co	3450	12th St		Wayland	MI	49348-9592	616-459-0941	7538U	3599A	7539F	
2707	Standard Incustrial Supply Sal		700a Military Pky		Mesquite	TX	75149-4119	214-289-0701	7359E	3569	3498	3541F
2708	Standard Machine & Tool Inc	121	Mid Town Ct		Hendersonville	TN	37075-2320	615-822-5156	3599A			
2709	Standard Parts	800	S Patterson Blvd		Dayton	OH	45402-2683	513-228-2111	5531	3599A		
2710	Staneco Corp	901	Sheehy Dr		Horsham	PA	19044-1280	215-672-6500	3829			
2711	Stanek Tool Corp	2500	S Calhoun Rd		New Berlin	WI	53151-2712	414-786-0120	3599A			
2712	Stanislaus Implement & Hard Co		10th & F		Modesto	CA	95352	209-523-0781	5551	3452	5082A	3523
2713	Star Design Corporation	3959	Valley East Industrial Dr		Center Point	AL	35215	205-856-4144	3599F			
2714	Star Mach	6620	Crull St		Newtown	OH	45244-3416	513-561-2278	3599A			
2715	Star Machine Co	17	Airport Rd		Nashua	NH	03063-1713	603-882-1423	3599A			
2716	Star Machine Systems	4921	Carver Ave		Southampton	PA	18954	215-355-3799	3599A			
2717	Star Machine Works	904	Winston St		Houston	TX	77009-3676	713-864-4793	3599A			
2718	Star Pipe Service	3501	S	I-35	Moore	OK	73160	405-799-1977	1389K			
2719	Starlite Mfg Co Sales Ofc				Pittsburgh	PA	15123	412-367-3339	3089			
2720	Std Precision Gear & Instrum.ent Inc	1063	Turnpike Stoughton		Canton	MA	02021	617-828-4400	3599A			
2721	Steel Forgings Incorporated	172	Lee Dr		Baton Rouge	LA	70808-4953	504-766-7221	3462			
2722	Steel Processing		Po Box	3932	Santa Fe Springs	CA	90670-1932	310-944-7340	3541H			
2723	Steelcraft Fabricator	1000	21st St Sw		Demotte	IN	46310-9222	219-987-2978	3312			
2724	Steelwave	12085	Branford St		Pacoima	CA	91333	818-897-5248	3441	3469		
2725	Steffl Drilling & Pump Inc	8370	Highway 23 Ne		Spicer	MN	56288-9417	612-235-8484	1781	3599E	5082H	

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[redacted]726	S[redacted]Wm Mfg Co	29	E Halsey Rd		Parsippany	NJ	07054-3704	201-887-6400	3544B			
2727	S[illegible] Inc Mail Shipping		N6323 Berlin Rd		Green Lake	WI	54941-9754	414-294-6544	3699C			
2728	Stenman Wire & Metal Products		West St		Auburn	MA	01501	508-832-4680	3399	3469	3496A	
2729	Stenor Tool Co	944	Sheridan St		Chicopee	MA	01022-1036	413-593-1467	3599A			
2730	Stephens And Associates	2	W Kentucky Ave		Woodland	CA	95695-5837	916-661-4118	8711	3599E	1781	
2731	Stephens Bob	3744	Applegate Ave		Cincinnati	OH	45211-5402	513-661-0633	3363			
2732	Sterling Machine Co Inc	104	Port Arthur Ave		Mena	AR	71953-3344	501-394-4248	3541H	3599A		
2733	Sterling Machine Shop	1625	Main St		Lewiston	ID	83501-2024	208-743-5132	3599A			
2734	Sterling Metalcraft	1753	N Honore St		Chicago	IL	60622-1331	312-276-3050	3399	1791D		
2735	Stern Industries Inc	34225	Groesbeck Hwy		Clinton Township	MI	48035-3357	810-791-2344	3469	3544D		
2736	Stewarts Tool		Mrlbr Vndrbh Rd		Holmdel	NJ	07777	908-946-4600	3599A	3544D		
2737	Stg Machine	481	Gianni St		Santa Clara	CA	95054-2414	408-988-8582	3599A			
2738	Stippler Tool & Supply Inc	816	9th Ave		Evansville	IN	47712-5396	812-425-3518	3291	3569	5051D	5084Y
2739	Stokes Machine Shop	104	8th St		Colusa	CA	95932-2308	916-458-4121	3599A			
2740	Stollen Machine & Tool Co Inc	761	Lexington Ave		Kenilworth	NJ	07033-2015	908-241-0622	3541H	3599A		
2741	Stoner Machining Co	1450	W Lark Industrial Dr		Fenton	MO	63026-4396	314-677-3133	3364	3599A		
2742	Stones Transmission Servic	6108	Dixie Hwy		Saginaw	MI	48601	517-777-3610	3699A			
2743	Story Plastics Inc	3333	W Pacific Ave		Burbank	CA	91505-1553	818-842-7167	3089			
2744	Strafford Machine & Welding		Province Rd		Strafford	NH	03884	603-664-9758	3599A	7692D		
2745	Stratford Molded Plastics Inc	7237	Eton Ave		Canoga Park	CA	91303-1506	818-999-6607	3089			
2746	Strats	2906	Mannheim Rd		Franklin Park	IL	60131-2224	708-455-3040	3544E	5812		
2747	Straub Design Co	2238	Florida Ave S		Minneapolis	MN	55426-2804	612-546-6686	8711L	3599F		
2748	Studer Inc	72	Grays Bridge Rd		Brookfield	CT	06804-2632	203-775-0459	3541H			
2749	Suburban Industrial Supply	9536	W Foster Ave		Chicago	IL	60656-1029	708-678-5250	3569			
2750	Suffield Pattern Works	576	Saint James Ave		Springfield	MA	01109-3832	413-732-5379	3999A			
2751	Sulzer Bingham Pumps Inc	11521	Industriplex Blvd		Baton Rouge	LA	70809-4233	504-751-9962	3599E			
2752	Sulzer Bingham Pumps Inc	9856	Jordan Cir		Santa Fe Springs	CA	90670-3303	310-903-1000	3599E			
2753	Sumar Tool & Engineering Inc	33765	Grosebeck		Fraser	MI	48026	810-415-8174	3599A			
2754	Summit Co	10621	Bloomfield St Ste	10	Los Alamitos	CA	90720-2528	310-431-8799	3999A			
2755	Summit Machine Tool Mfg Co	625	Hawthorne Rd		Buffalo Grove	IL	60089-3314	708-541-0619	3541			
2756	Summit Supply Co	1026	Courtesy Rd		Houston	TX	77032-2806	713-987-9750	3498			
2757	Suncoast Heat Treat Inc	3645	8th Ave S		Saint Petersburg	FL	33711-2203	813-327-6850	3398			
2758	Suncraft Machine Sales & Service	1617	Los Tomases Dr Nw		Albuquerque	NM	87102-1232	505-842-9646	3599A			
2759	Sunset Machine Inc	5400	Scio Church Rd		Ann Arbor	MI	48103-9287	313-663-5001	3599E			
2760	Sunshine Aluminum Specialties Inc				Delray Beach	FL	33483	407-272-4414	3354	5999D	7521A	1521C
2761	Sunshine Industries	2331	6th Ave S		Saint Petersburg	FL	33712-1749	813-327-3396	3599A			
2762	Supa Machinery Sales Inc	2727	3 Mile Rd		Franksville	WI	53126-9601	414-835-3400	3541	3599E		
2763	Superior Aluminum Products Inc	105	Francis		Russia	OH	45363	513-526-4065	5039	3365		
2764	Superior Bolt & Supply Co	612	Robert E Lee Dr		Tupelo	MS	38801-5536	601-840-5700	3452			
2765	Superior Metal Products Inc		Po Box 490/2463 Hwy	107	Chuckey	TN	37641	615-257-2154	3599A	3469		
2766	Superior Mold & Die Co	449	N Main St		Munroe Falls	OH	44262-1007	216-688-8251	3544E			
2767	Superior Pipe Inspection Inc	1706	Laurent Armentor Rd		New Iberia	LA	70562	318-364-9712	1389K			
2768	Superior Pipe Products	8120	S 81 S		Sapulpa	OK	74066	918-224-6575	3498			
2769	Superior Tool	342	Mount Bethel Rd		Pickens	SC	29671-9630	803-868-9450	3544B	3599A	3451	
2770	Superior Tooling Inc	3125	O Gresham Lake Rd		Raleigh	NC	27615	919-878-5758	3599A	3544E		
2771	Superior Valve Co	9041	Dice Rd		Santa Fe Springs	CA	90670-2519	310-946-6698	3494			
2772	Supreme Machine & Tool Co Inc		Washington Ave		Limerick	ME	04048	207-793-2835	3599A			
2773	Sure Cast Inc	3417	Dublin Trl		Mesquite	TX	75149-6751	214-289-0846	3369			
2774	Surry Machine Works	200	E Oak St		Mount Airy	NC	27030-3824	910-789-3681	3599A			
2775	Sutterlin Mach & Tool Co Inc	9445	Pineneedle Dr		Mentor	OH	44060-1827	216-357-0817	3544B	3599A	3599F	
2776	Suttons Steel & Supply Inc		Hwy 182 E		New Iberia	LA	70562	318-365-2441	3498	5051D		
2777	Svedala Industries	24	Beth Ellen Dr		Lewisburg	PA	17837-8814	717-523-9700	3541H			
2778	Svinga Brothers Corp	3495	Nw North River Dr		Miami	FL	33142-4924	305-635-1067	3364A			
2779	Swanson Welding & Machine Shop	14835	34th St Se		Wheatland	ND	58079-9514	701-633-5205	7538C			
2780	Sweetwater Industries	5187	Bryan Rd		Richmond	TX	77469-8939	713-342-0720	3599A			
2781	Swiss Tech Precision	8976	Glenoaks Blvd		Sun Valley	CA	91352-2059	818-768-9153	3451	3599A		
2782	Swissco Inc	6520	Clara St		Bell Gardens	CA	90201-5608	310-927-7866	3599A			
2783	Swpie Etc	5545	W Lovers Ln		Dallas	TX	75209-4219	214-357-5931	3599D	5722D		

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2784	Sy[illegible]ron Laser Service Job Sho	12900	10 Mile Rd		South Lyon	MI	48178-9186	810-486-0402	3699C			
2785	S[illegible]nc	129	Rawls Rd		Des Plaines	IL	60016	708-827-3150	30893			
2786	Syste[illegible]. Company Mfrs Agt	3237	Lorna Rd		Hoover	AL	35216-5403	205-979-2070	3829	3559A		
2787	Systems & Machinery Services		Po Box	16542	Salt Lake City	UT	84116-0542	801-596-7450	7699A	3599E		
2788	Systems For Energy Control	55	Vine Ave		Highland Park	IL	60035-2018	708-433-4804	3823	7342	9511	3822
2789	Systems Technology Inc	2830	Holmestown Rd		Conway	SC	29527	803-650-2225	3732A	8748L	3599A	3599F
2790	T & A Industrial Distributors	12550	Robin La		Brookfield	WI	53005	414-783-4900	3569			
2791	T & C Grinding Service		1100-C Duncan		Wilmington	DE	19801	302-656-9406	3599A			
2792	T & C Pipe & Supply Salvage	923	Sartain Dr		Andrews	TX	79714-3817	915-523-3648	3498			
2793	T & M Mach Products Inc		State Rte 691 Nw		Nelsonville	OH	45764	614-753-2960	3544B	3599A		
2794	T & M Tool	2567	N Narragansett Ave		Chicago	IL	60639	312-745-8626	3544D			
2795	T & S Machine Shop	11882	Nc	87	Eden	NC	27288	910-627-8491	3599A	1791D		
2796	T & T Machining	8147	Pleasant Ave		Minneapolis	MN	55420-1140	612-881-3548	7538C	3599A		
2797	T F S Systems	211	W Maple Ave		Monrovia	CA	91016-3329	818-358-5507	3523			
2798	T H Welding & Machine Shop	6329	Mcray Dr		Pineville	LA	71360-2933	318-640-0797	3599A	7692D		
2799	T J Coleman & Company	4513	Canton Hwy		Marietta	GA	30066-1063	770-591-4843	3699C	3829C		
2800	T P C Co		Shady Glen Rd		Oak Hill	NY	12460	518-239-6369	3599E			
2801	T Q M Machine Co	408	Hawk St		Rockledge	FL	32955-3249	407-636-8438	3599A			
2802	T Tooler Co	1920	Lafayette St		Santa Clara	CA	95050-3956	408-980-1186	3541H			
2803	T W L Industries Inc	5004	Tampa West Blvd		Tampa	FL	33634-2412	813-884-0695	3599A			
2804	T-J-Z Precision Machining	11235	Franklin St		Northglenn	CO	80233-3236	303-451-7335	3599A			
2805	T-M Mfg Co	695	E Arques Ave		Sunnyvale	CA	94086-3832	408-736-5202	3541H	3599A	7692D	
2806	T/A Machine & Tool	615	E 9th St		Joplin	MO	64801-4919	417-782-7242	3599A			
2807	Taber Machine & Welding	212	Dinn Dr		San Antonio	TX	78218-3713	210-653-9599	3599A			
2808	Tabor Mining Mfg Equipment Co	4900	Memco Ln		Racine	WI	53404-1160	414-639-2420	3599A	1622		
2809	Tahlequah Machine Shop		W Of City		Tahlequah	OK	74465	918-456-6021	3599A	1791D	7692D	
2810	Talbot Tool		Chestnut Grove Rd		Manchester	GA	31816	706-846-2081	3599A	3544D		
2811	Talbot Welding & Machinery In		Hwy	1	Labadieville	LA	70372	504-526-4252	3523	5083	3599A	7692D
2812	Talladega Casting & Machine Co		N Court St		Talladega	AL	35160	205-362-5550	3363	3364	3599	
2813	Tallmadge Spinning & Metal Co	935	Southeast Ave		Tallmadge	OH	44278-3154	216-633-4812	3699C	1791D	3444	7692D
2814	Tana Corporation	3843	Seiss Ave		Toledo	OH	43612-1373	419-476-5995	3545	3469	3544D	
2815	Tangent Industries		Smyrna Airpt		Smyrna	TN.	37167	615-459-6921	3599A			
2816	Tap Plastics Inc Store	7176	Regional St		Dublin	CA	94568-2324	510-828-7744	5033	3544E	3087	3086
2817	Tape Controlled Machining Co	19430	Business Center Dr		Northridge	CA	91324-3505	818-993-7171	3599A			
2818	Target Molds	16202	Arrow Hwy		Irwindale	CA	91706	818-960-9432	3544E	3089		
2819	Taro-Loid Inc	2943	Supply Ave		Los Angeles	CA	90040-2707	213-685-9444	3291	5085S	3498	
2820	Tates Machine Shop		Mills Gap Rd		Fletcher	NC	28732	704-684-7909	3599A			
2821	Taylor Implement Co		W Hwy	24	Hoxie	KS	67740	913-675-3272	5531A	3523	7699	
2822	Taylor Spring Manufacturing Co	9221	S Kilpatk Ave		Oak Lawn	IL	60453	708-422-3704	3316			
2823	Taylors Machine & Welding Co	1910	Cumberland Ave		South Pittsburg	TN	37380-1726	615-837-7217	3566	3599A	3714B	3441
2824	Tcf Associates Inc	825	B & C Industrial		Richwood Village	TX	77531	713-265-8188	3494			
2825	Tcm	4747	S 83rd East Ave		Tulsa	OK	74145-6921	918-664-1151	5084A	3599A	3561	
2826	Td Machine Company	7413	Wright Rd		Houston	TX	77041-2421	713-896-4970	3599A			
2827	Tds Machining Inc	8400	Wilmette Ave		Darien	IL	60561-5427	708-964-0004	3599A			
2828	Team Cols Aerospace Inc	1420	Fields Ave		Columbus	OH	43211-2635	614-299-8500	3599A	3544E	3089	3544D
2829	Team Manufacturing	2884	N Park Rd		Hollywood	FL	33021	305-986-9426	3599A			
2830	Tech Mold Corp	116	Antique Ln		De Forest	WI	53532-1137	608-846-5010	3599A			
2831	Tech Sales Inc				Casper	WY	82601	307-234-9636	3829			
2832	Tech Tools		8-E Dudley Dr		Roebuck	SC	29376	803-574-6764	3599A			
2833	Technical Compression Services Inc Odessa	8701	Andrews Hwy		Odessa	TX	79765-2836	915-367-7264	3599A			
2834	Technical Machine Components I	51	Lake St		Nashua	NH	03060-4513	603-880-0444	3599A			
2835	Technical Precision	1	Vanderbilt Ave		Pleasantville	NY	10570-2805	914-769-1696	3599A			
2836	Technical Services Corp	121	Floyd Thompson Dr		Hampton	VA	23666-1307	804-865-0920	3599A	8071		
2837	Techniform Industries Inc	2107	Hayes Ave		Fremont	OH	43420-2695	419-332-8484	3599F	3559A	3089	
2838	Technipipe	9888	Bissonnet St		Houston	TX	77036-8202	713-995-5200	3498			
2839	Techniplast Inc	3200	W 22nd St		Erie	PA	16506-2308	814-838-6817	3089			
2840	Technology Plastics Inc	2100	Northwestern Ave		West Bend	WI	53095-1678	414-335-0601	3089			
2841	Technox Machine & Mfg Inc	2619	N Normandy Ave		Chicago	IL	60635-2225	312-745-6800	3599A	3599D		

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842	R Enterprises	3561	Chinagardenrd		Diamond Springs	CA	95619	916-621-0571	3443B			
2843	T[illegible]ric	800	Emerald Bay Rd		South Lake Tahoe	CA	96150-6419	916-541-3225	7699A	76	599E	
2844	Teas [illegible]air & Machine	7502	5th Ave S		Seattle	WA	98108-4114	206-246-2550	3599A			
2845	Teemark Inc	1560	W 7 St		Saint Paul	MN	55169	612-222-2501	3699C	5999E		
2846	Tejas Boiler Services Inc	7206	Elbert St		Houston	TX	77028-3114	713-631-8200	3443			
2847	Teledyne Pines H & H Tool Div	430	S Navajo St		Denver	CO	80223-2015	303-744-6304	3544D	3011		
2848	Temco Inc	28	By Pass		Anderson	SC	29622	803-226-8509	3599A	3544D		
2849	Tempe Precision Ltd	135	Dale St		West Babylon	NY	11704-1103	516-249-6210	3599A			
2850	Temr	15311	Old Us Highway	441	Tavares	FL	32778-5053	904-343-5595	5063C	3599E		
2851	Temrick Inc	1605	Sycamore Ave		Bohemia	NY	11716-1725	516-567-8860	3541H			
2852	Tennessee Tool & Machine Works Company	4716	Dayton Blvd		Chattanooga	TN	37415-2104	615-870-4485	3599A	3544D		
2853	Terminix International				Syosset	NY	11791	516-364-7502	3823			
2854	Terry Industries Inc	800	S Council St		Muncie	IN	47302-2309	317-282-2724	3469	3544D		
2855	Tesco Hi-Lift Inc	3400	Nw 46th Ave		Davie	FL	33312	305-791-9470	3594A	1791D	3542	3441
2856	Tesla Company	16182	Pearson Rd Ne		Poulsbo	WA	98370-8027	360-697-7197	3569H			
2857	Testa Machine Company Inc		Baird		Slovan	PA	15078	412-947-9397	3599A			
2858	Texas Aluminum Foundry Inc Fax	204	Penland St		Fort Worth	TX	76111-4623	817-834-7531	3364	3369		
2859	Texas American Pipe & Supply Co Inc	4288	Spring Valley Rd		Dallas	TX	75244-3616	214-458-7358	3498			
2860	Texas Metal Structures Unlimited	2250	Turner Rd		China	TX	77613	409-752-5666	1541A	3444		
2861	Texas Prototype Machine & R	2730	Se Loop	820	Fort Worth	TX	76140-1016	817-293-1324	3599A			
2862	Texas Trade International Inc	10700	Richmond Ave		Houston	TX	77042-4905	713-952-6533	3498			
2863	Texas Wholesale Products	2727	Kirby Dr		Houston	TX	77098-1201	713-528-6492	3569			
2864	Texas-Agri Machine & Industrial Manufacturing		W Of City		Plainview	TX	79072	806-296-5765	3599A	3559F	7699	3599E
2865	Textile Measuring Machines				Mehlville	MO	63129	314-487-9666	3829			
2866	Tgs Machinery Inc	511	Glenn Ave		Wheeling	IL	60090-6015	708-465-1112	3569			
2867	The Hub Pattern Corp	2113	Salem Ave Sw		Roanoke	VA	24016-2515	540-342-3505	3321	3549		
2868	The Machinery House	5650	Snake Rd		Oakland	CA	94611-2910	510-531-0481	7389A	3545		
2869	Thermoset Plastics Inc		Airport		Mitchell	SD	57301	605-996-9752	3599A			
2870	Thieman Stamping Co	5140	Dicke Rd		New Bremen	OH	45869-9771	419-629-2612	3469			
2871	Thomas Industrial Machinery Co Inc	36	Roanoke Ave		West Springfield	MA	01089-3710	413-788-4007	3599E			
2872	Thomas Machine Repair				East Hartford	CT	06108	203-282-4717	3599D			
2873	Thornton Drilling Fax Line		207-1/2 Ne Washington Blvd		Bartlesville	OK	74006	918-335-2281	3541C			
2874	Thorobred Pattern & Mold Inc	1400	W Madison St		Louisville	KY	40203-1740	502-585-4901	3321	3599A	3544E	3543
2875	Thorpe-Smith Inc	211	Expressway Ct		Virginia Beach	VA	23462-6526	804-497-2289	5049B	8711	3699C	3829C
2876	Three 60 Corp	10823	Plaza Dr		Whitmore Lake	MI	48189-9737	313-449-0099	3089			
2877	Three Way Die Co	1119	Venice Blvd		Los Angeles	CA	90015-3213	213-388-2822	3999L	3544D		
2878	Tietz & Baur Plastics Inc	5009	Lake Melros Pk		Chicago	IL	60644	312-378-3181	3089			
2879	Time Electronics	1041	Lowden Ave		Union	NJ	07083-7706	908-353-0933	3599A	7699X		
2880	Tinker Machining Co Inc	.	Elkridge Landing Rd		Glen Burnie	MD	21061	410-859-8390	3599A			
2881	Tir-R Tooling	867	Lenox Ave		Mansfield	OH	44906-2040	419-747-6173	3599A	7699D		
2882	Todd Tool & Machine		Us Hwy 130 Cathy Ln		Roebling	NJ	08554	609-499-0407	3599A			
2883	Todds Hydraulic Repair & Steel Fab		Ft Harrison Industrial Pk		Terre Haute	IN	47805	812-466-3457	3052	3494	3599E	3569
2884	Tokins Enterprises Inc	127	Tokins Dr		Jackson	MS	39208-9140	601-939-1093	3541	3599E		
2885	Tolby Equipment	7909	W Glendale Ave		Glendale	AZ	85303-2309	602-937-1636	5082	3523	5511B	
2886	Toledo Molding & Die Corp	4	E Laskey Rd		Toledo	OH	43612-3517	419-476-0581	3544E			
2887	Toms Iron Works Inc Thomson Tom G	4648	Palmer Dr		West Valley City	UT	84120-4960	801-969-6888	3548A			
2888	Toms Precision Machine	2764	Cloverdale Ave		Concord	CA	94518-2415	510-682-6099	7538C			
2889	Toms Welding	3708	1st Ave S		Great Falls	MT	59401-3520	406-761-0936	3599A	7692D		
2890	Tomys Custom Machining & Repair	2414	S 8th St		Kansas City	KS	66103-1804	913-362-8267	3599A			
2891	Tool & Abrasive Engr Co	1203	Dell Ave		Campbell	CA	95008-6612	408-374-5620	3291	3569		
2892	Tool & Die Supply Inc	2681	Halladay St		Santa Ana	CA	92705-5617	714-549-9201	3544D	3999L	5051D	
2893	Tool Matic Corp	219	N Justine St		Chicago	IL	60607-1467	312-421-3044	3451			
2894	Tool Repair Company Inc	18900	Meginnity St		Melvindale	MI	48122-1932	313-928-1000	3599A	7699D	5084Y	7692D
2895	Tool-Rite Machine & Development Inc	19	Courtland Dr		Greenville	SC	29609-2523	803-246-6346	3599A			
2896	Toolcraft Products Inc	1265	Mccook Ave		Dayton	OH	45404-2800	513-223-8271	3541	3599A	3544D	
2897	Tooling Enterprises Inc	680	New Babcock St		Buffalo	NY	14206-2201	716-842-0445	3544D	3544B	3599A	3469
2898	Toolroom Craftsmen Inc	312	Marlboro St		Keene	NH	03431-4165	603-357-2510	3599A			
2899	Tools For Bending Inc	194	W Dakota Ave		Denver	CO	80223-2195	303-777-7170	7538Z	3559	3398	3599A

2900	Tc [illegible] Plus Inc	3	Old Mauldin Rd		Greenville	SC	29607-4271	803-277-9029	7699P	354[illegible]	[illegible]084Y	
2901	Tc[illegible]ol & Manufacturing	500	Laurelwood Rd		Santa Clara	CA	95054-2417	408-988-2547	3599A	35[illegible]	[illegible]731B	
2902	Topp[illegible]stics Inc	461	E Front St		Covina	CA	91723-1299	818-331-0561	3089			
2903	Tor Tool Works	10	Liberty Ship Way		Sausalito	CA	94965-1700	415-332-8835	3541			
2904	Totem Plastics	1841	E Acacia St		Ontario	CA	91761-7704	909-947-3900	3085	3544E	3089	
2905	Tottser Tool & Die Shop Inc	1630	Republic Rd		Huntingdon Valley	PA	19006-1808	215-357-7600	3544D	3363		
2906	Towaco Screw Machine Products Co	16215	Sunset Rd		Bothell	WA	98012-6171	206-481-7100	3451	3599A		
2907	Townsend Implement Co	4920	W Bus Hwy	83	Mc Allen	TX	78501	210-682-1331	5082A	3523	7699	3621
2908	Trackreations	27820	Fremont Ct		Santa Clarita	CA	91355-1141	805-294-0042	3599A			
2909	Tracy B P Co (Division W)		Green Ave		Washington	PA	15301	412-228-2160	3599			
2910	Tracy Equipment		Hwy	13	Tracy	MN	56175	507-629-4740	3523	7699	5261C	
2911	Trade & Tool Supply Co	613	Bound Brook Rd		Middlesex	NJ	08846-2103	908-968-0830	5072E	5072D	5051R	3545
2912	Trade Die Cutting	1623	Maria St		Burbank	CA	91504-3420	818-843-8040	3999L			
2913	Trade Tech	1354	N 7th St		Milwaukee	WI	53205-2501	414-271-6890	3599D			
2914	Trainer Metal Forming Inc	224	Riggs Ave		Portland	TN	37148-1500	615-325-7088	3542			
2915	Trane Company	6000	Nw 2nd St		Oklahoma City	OK	73127-6515	405-787-2237	1711C	5075R	7623E	3829
2916	Trans-Electric	2120	Dixon Ave		Missoula	MT	59801-8226	406-549-4263	3714	7537		
2917	Transnav Inc Usa	21428	Carlo Dr		Clinton Township	MI	48038-1512	810-954-3600	3544E	3021		
2918	Transportation Seating Inc				Marshallville	GA	31057	912-967-2227	3721			
2919	Tranter Inc	803	S Van Buren St		Little Rock	AR	72204-1841	501-663-9421	5074D	1711E	3443	7699J
2920	Trayer Engineering Corp	898	Pennsylvania Ave		San Francisco	CA	94107-3441	415-285-7770	3699			
2921	Trebor Instrument Co	39	Sarah Dr		Farmingdale	NY	11735-1218	516-293-8127	3599A			
2922	Trek Div Of Letts Ind	13195	Santa Ana Ave		Fontana	CA	92337-6950	909-822-1455	5082A	5511B	3599E	
2923	Tremblays Machine Shop	427	Ne 3rd St		Crystal River	FL	34429-4214	904-795-0309	7538C			
2924	Tri State Machine	2974	West		Gastonia	NC	28052	704-868-2682	3599A			
2925	Tri-City Molds Inc	809	W Main St		Forest City	NC	28043-2515	704-245-6448	3599A			
2926	Tri-Plas Inc	3414	Wesley Chapel Stouts Rd		Monroe	NC	28110-7945	704-372-0752	3089	3021		
2927	Tri-State Engineering Inc		Milford St & S Salisbury Blvd		Salisbury	MD	21802	410-742-3156	3599A	7623		
2928	Tri-State Machinery Co	535	Mcneilly Rd		Pittsburgh	PA	15226-2503	412-344-6500	3541			
2929	Tri-State Machining Co	3034	Ohio Dr		Henderson	KY	42420-4337	502-827-8291	3599A			
2930	Tri-State Mfg & Distributing Co	911	Theil Rd		Paragould	AR	72450-9060	501-239-9691	3714			
2931	Tri-States Foundry Inc	812	Highway 287 S		Mansfield	TX	76063-3425	817-478-9481	3364	3369		
2932	Tri-Tube Inc		Rr	10	Abingdon	VA	24210-9810	540-628-5932	3499			
2933	Triangle Manufacturing Co Inc	116	Pleasant Ave		Ramsey	NJ	07446	201-825-1212	3599A			
2934	Triangle-Goss Tool Co Inc	100	Harding St		Kensington	CT	06037-1309	203-828-4121	3541	5084		
2935	Triangler Co	1165	Yellow Springs Rd		Chester Springs	PA	19425-1616	610-827-7992	3469			
2936	Tricon Metals & Service Inc		Irondale Indl Park		Birmingham	AL	35243	205-956-2567	3599A	3089	5051D	3441
2937	Trident Supply Co	5760	Sw 25th St		Ocala	FL	34474-9476	904-873-6300	3494			
2938	Triflex Abbrasives Inc	5220	Nw 72nd Ave		Miami	FL	33166-4858	305-593-1246	3291	5085		
2939	Trinity Machine Shop	78	Cane Creek Rd		Jackson	TN	38301-9104	901-422-4345	3599A			
2940	Trinity Machine Tool	14	Fairfax Ave		Blackwood	NJ	08012-2846	609-228-5923	3599F			
2941	Trio Production Co Inc	11100	Cumpston St		North Hollywood	CA	91601-2713	818-766-2957	3599A			
2942	Triple A Mfg Co Inc	4	Paul St		Bethel	CT	06801-1796	203-743-9043	3599A	3541		
2943	Triple D Machine		Honey Creek		Jamestown	TN	38556	615-879-4889	3599A			
2944	Triple S Machine Inc	1546	E Turkeyfoot Lake Rd		Uniontown	OH	44685	216-896-4084	2399	3599A		
2945	Tripp Plastics	250	Greg St		Sparks	NV	89431-6201	702-355-7552	3089			
2946	Trojan Mfg Co	635	W Water St		Piqua	OH	45356-2157	513-778-8473	3541H			
2947	Troll E A Tool Inc	15	Commerce Rd		Newtown	CT	06470-1607	203-426-5525	3599A			
2948	Tropic Machine Products	264	Sw 33rd St		Fort Lauderdale	FL	33315-3328	305-779-7038	3599A	3544D		
2949	Tropic Tool & Mold Inc	303	Wagner Dr		Boaz	AL	35957-1063	205-593-3441	3544E			
2950	Tru-Tec Division	401	S 8th St		La Porte	TX	77571-4947	713-471-8970	3823			
2951	Tru-Tex International Corp	11050	Southland Rd		Cincinnati	OH	45240-3713	513-825-8844	3599K			
2952	True Cut Die Cutting	7	Elbern Dr		Poughkeepsie	NY	12603-4501	914-462-6027	3999L			
2953	Trumbull Industries	68	Market St		Lockport	NY	14094-2926	716-433-3853	3569			
2954	Trumpf America Inc		Hyde Rd		Farmington	CT	06032	203-677-9741	3444			
2955	Trumpf Inc				Santa Fe Springs	CA	90670	310-946-7664	3541			
2956	Tucker Dan	1717	Villa Rd		Newberg	OR	97132-9564	503-538-4328	3545			
2957	Tucker Equipment	3131	Sankley Rd		Pleasant Grove	CA	95668	916-655-3542	3599E			

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2959	T[illegible]phalt Paving Co Inc		Quogue Neck Ln		Eastport	NY	11941	516-325-0959	3531C			
2960	Tu[illegible]e & Fitting Co	1815	W Detroit St		Broken Arrow	OK	74012-3613	918-258-8661	3494	34[illegible]		
2961	Tupelo Tool & Die Co	1233	S Veterans Blvd		Tupelo	MS	38801-5812	601-844-2138	3544B	3599A	3544D	
2962	Turfster International	800	N Old U S	23	Brighton	MI	48116	810-632-9500	3599E			
2963	Turner Engineering	3415	S 43rd Ave		Phoenix	AZ	85009-6038	602-272-6014	3599A			
2964	Turner Graphic Services	7260	High Point Rd		Douglasville	GA	30134-3419	770-949-3351	1796B	3599E	5084F	1389J
2965	Turner Machine Inc				Murfreesboro	TN	37131	615-896-9888	3544D			
2966	Turning Point Machining	710	Ash Ave		Marysville	WA	98270-4539	206-252-7300	3599A			
2967	Twin Tool Inc	378	8th St E		Saint Paul	MN	55101-2403	612-224-5303	3544E	3544D		
2968	Two-M-Precision Co Inc	29631	Lakeland Blvd		Wickliffe	OH	44092-2203	216-585-0906	3599A	3541H		
2969	Tws Pump & Supply		Garden City Hwy		Midland	TX	79701	915-685-0155	1629L	7359L	3561	3599E
2970	Tylers Machine Shop Inc	308	Spring St		Washington	GA	30673-1718	706-678-2014	3599A	7692D		
2971	Tyvin Inc	4418	Auburn Wy		Auburn	WA	98001	206-852-0333	3599A			
2972	U & H Star Fleet Inc	7111	Five Forks Dr		Spring	TX	77379-4101	713-376-1597	3711			
2973	U K M Co Inc-Mtkng Andalysis	3061	Ridge Rd		Perkasie	PA	18944-3901	215-257-0122	3599A			
2974	U P Machine Engineering Co Precision Produc	210	N 3rd		Powers	MI	49874	906-497-5278	3599A			
2975	U S Machine Shop Nights Sundays Holidays	501	E Cleveland Ave		Electra	TX	76360-3025	817-495-3922	3599A			
2976	U S Tool & Gauge Inc	1406	Industrial Park Rd		Paris	TN	38242-6099	901-642-6440	5084V	3599A	3544D	7699D
2977	Uff Machine Co		Church		Upland	PA	19013	610-876-7157	3599A			
2978	Ulander Machine Company	10704	Deandra Dr		Zionsville	IN	46077-9221	317-873-6792	3599A			
2979	Ultimate Hydroforming Inc	42450	Yearego Dr		Sterling Heights	MI	48314-3262	810-254-2300	3599A			
2980	Ultra Metric Tool Co	2952	N Leavitt St		Chicago	IL	60618-8115	312-281-4200	3545	3599A		
2981	Uneeda Enterprises Inc	640	Chestnut Ridge Rd		Spring Valley	NY	10977-5653	914-426-2800	3291			
2982	Unified Machine & Design Inc	111	Mountain Ave		Middlesex	NJ	08846-2516	908-469-1570	3599A			
2983	Unified Tool Die & Manufacturi	9331	Seynour Ave		Chicago	IL	60606	312-625-7194	3544D			
2984	Union Machine Company Inc		Lakeland Park Dr W		Peabody	MA	01960	508-535-7337	3599A			
2985	Uniquee Edm & Engineering	3669	Arundell Cir		Ventura	CA	93003-4978	805-650-8792	3599A			
2986	United Auto Transmission	174	Washington St		Claremont	NH	03743-2755	603-542-0001	7538	3714	7537	
2987	United Electric Company	14325	23rd Ave N		Plymouth	MN	55447-4704	612-473-1810	3829	3629	5075B	3625B
2988	United Technologies Corporation Sikorsky Airc	6900	Main St		Stratford	CT	06497-1378	203-386-4000	3728	3721		
2989	United Welding	1430	Camwood Trl S		Baxter	MN	56401-8066	218-828-7032	3365			
2990	Unitek	1025	Meadow Ln		Des Moines	IA	50315-6641	515-285-4575	7629K	3599E		
2991	Universal Automotive Engine Parts	222	W Utah Ave		Las Vegas	NV	89102-2715	702-384-5858	7538C	5531		
2992	Universal Diecutters Corp	8480	S R	66	Wadesville	IN	47638	812-985-5942	3999L			
2993	Universal Electric Foundry	1523	W Hubbard St		Chicago	IL	60622-6387	312-421-7233	3369			
2994	Universal Iron Works & Machine Shop Co	5420	Eden Ln		Corpus Christi	TX	78407-1402	512-289-2714	7538C			
2995	Universal Machining & Manufacturing Inc	410	Nelo St		Santa Clara	CA	95054-2144	408-988-3720	3599A			
2996	Universal Machining & Manufacturing Systems	1984	Meadowbrook Rd		Benton Harbor	MI	49022-9605	616-926-8320	3599A			
2997	Universal Manufacturing & Mach	353	E 69 Highway		Kansas City	MO	64100	816-453-5422	3599A			
2998	Universal Metalcraft Inc		Rr	8	Decatur	IN	46733-9808	219-547-4457	3499			
2999	Unytrex Inc	44267	Phoenix Dr		Sterling Heights	MI	48314-1466	810-739-3333	3544E			
3000	Upc	1501	S Stoughton Rd		Madison	WI	53716-1853	608-222-5658	3993A	3021	3089	
3001	Upcountry Machine Shop	636	Omaopio Rd		Kula	HI	96790	808-878-1076	4213C	3599A		
3002	Uptilt Inc	1820	Sunset Ave		Lansing	MI	48917-1811	517-482-0795	3469			
3003	Uribe Steel	8917	Sheldon Rd		Houston	TX	77049-1815	713-456-0835	1791D	1711P	3498	3441
3004	Us Die Casting Equipment Inc	19882	Blue Star Memorial Hwy		South Haven	MI	49090-9447	616-637-3267	3542			
3005	Us Machine Shop	501	E Cleveland Ave		Electra	TX	76360-3025	817-495-4211	3599A	1389B	7692D	
3006	Usa Components Inc	10301	Nw 50th St		Sunrise	FL	33351-8009	305-572-3551	3599A			
3007	Uss Structural Glazing	2741	Losee Rd		North Las Vegas	NV	89030-4152	702-399-2741	3365	5231	1793	1791D
3008	V & L Machine & Tool Co Inc	136	Getty Ave		Clifton	NJ	07011-1840	201-772-6020	3599A			
3009	V K Boring Co	28182	Groesbeck Hwy		Roseville	Mi	48066-2389	810-779-4620	3541C	3599A		
3010	V N S Industrial Machining Inc	3050	Walker Dr		Green Bay	WI	54311-8313	414-468-6838	3541H	3599A		
3011	Vacuums Etc	1091	Broad St		Sumter	SC	29150-2504	803-775-4713	7359A	3599D	5722D	5064D
3012	Vaisala Inc	100	Commerce Way		Woburn	MA	01801-1008	617-933-4500	3829A			
3013	Valbrook Machine Corp		21b Railroad Ave		Valley Stream	NY	11580-6030	516-825-1234	3599A			
3014	Valcor Engineering Corp	2	Lawrence Rd		Springfield	NJ	07081-3165	201-467-8400	3494			
3015	Value Engineered Products	5420	W	83d	Los Angeles	CA	90000	310-337-7355	3599A			

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3016	Van Stone Conveyor Co Inc		56b E Fooothill Bl		Azusa	CA	91702	818-969-4331	3531			
3017	V[illegible] Equipment Inc		Hwy 141 E		Perry	IA	50220	515-465-5681	5084L	35	7359J	
3018	Va[illegible]nd Companies Van Zeeland Oil Co I	400	Moasis Dr		Appleton	WI	54911	414-738-3520	5013	59	1389	3559M
3019	Vanguard Industries				Lincoln	NE	68508	402-473-2992	3569D			
3020	Vanguard Metals Inc	135	Brightside Ave		Central Islip	NY	11722-2797	516-234-6500	3599A			
3021	Varel Products Varel Mfg Co	9230	Denton Dr		Dallas	TX	75235-1808	214-351-6486	3541C			
3022	Variety Widget Product Inc	310	Elizabeth Ln		Corona	CA	91720-2504	909-278-3100	3089			
3023	Varisystems	103	Brook St		Groton	CT	06340-5514	203-536-8419	3829			
3024	Varnadore Curt Pump Service	209	Bridgers Av E		Winter Haven	FL	33882	941-967-7624	3561	3599E		
3025	Vektek Inc	1334	E 6th Ave		Emporia	KS	66801-3389	316-342-7637	3599A			
3026	Venezia Machine Co	941	Linda Vista Ave		Mountain View	CA	94043-1902	415-961-6872	7699V	3599A	5046B	7692D
3027	Ventura Hose-Man	3500	Camino Ave		Oxnard	CA	93030-8983	805-988-1072	5099A	3494	5085H	3594A
3028	Ventura Metal Fab Inc	2550	Eastman Ave		Ventura	CA	93003-7714	805-654-8118	1791D			
3029	Venture Machine Co	3820	E 20th St		Joplin	MO	64801-5854	417-781-4361	3599A			
3030	Venture Mold & Engineering	34537	Bennett Dr		Fraser	MI	48026-1691	810-296-8084	3089			
3031	Ver Manufacturing	3250	Keller St		Santa Clara	CA	95054-2613	408-727-4747	3599A			
3032	Vera Nova Machine Shop	7343	Ronson Rd		San Diego	CA	92111-1412	619-571-5646	3599A			
3033	Veradyne Corp	177	W Magnolia Bl		Bradbury	CA	91010	213-849-6003	3599A			
3034	Verhey Coach & Limousine Sales & Leasing	1054	Front Ave Nw		Grand Rapids	MI	49504-4209	616-459-2788	3711	4141	4119B	
3035	Veriflo Corporation	250	Canal Blvd		Richmond	CA	94804-2002	510-412-1100	3494			
3036	Versa Automatics	144	W Gardena Blvd		Gardena	CA	90248-2719	310-538-3204	3599A			
3037	Versatec Supply	6941	Hermosa Cir		Buena Park	CA	90620-1151	310-921-1463	3494			
3038	Versatile Drilling Contract	7510	5th Ave S		Seattle	WA	98108-4114	206-763-9776	3541C	5039	1771E	
3039	Vgis Engine Rebuilders	7200	Se	92d	Portland	OR	97206	503-775-0396	7538C			
3040	Vian Enterprises Inc	174	Teamtrack Rd		Auburn	CA	95603-4347	916-885-1997	3599A	3541		
3041	Vibratec	1	Hollywood Ave		Ho Ho Kus	NJ	07423-1433	201-652-1300	3569			
3042	Vic Industrial Corp	229	E Emory Rd		Powell	TN	37849	615-947-2882	3291			
3043	Victoria Precision		410-C Clearview Ave		Southampton	PA	18954	215-355-7576	3599A			
3044	Videojet Systems International	58	Miles Ave		Fairport	NY	14450-2416	716-223-0270	3569			
3045	Viking Industries Inc	303	Industrial Rd		El Dorado	AR	71730-6615	501-862-5576	3089			
3046	Viking International Services		Po Box	4567	Walnut Creek	CA	94596-0567	510-825-6900	3829			
3047	Viking Supply	22	Industrial Pk Rd Negane		Marquette	MI	49855	906-226-6778	3569			
3048	Village Automatics Inc	69576	Section St		Edwardsburg	MI	49112-9655	616-663-8521	3599A			
3049	Village Castings	6919	Legion Dr		Caseville	MI	48725	517-856-4500	3369			
3050	Village Machine & Fabricating	3191	Sw 11th St		Deerfield Beach	FL	33442-8158	305-429-3703	3599A	3451		
3051	Vin-Built Welding	21	Sumner W		Springfield	MA	01144	413-736-2555	3599E	5039	7692D	
3052	Vinaco Eng Co	20952	Itasca St		Chatsworth	CA	91311-4915	818-700-0541	3599A			
3053	Vincent Machine Shop	308	S Congress Pkwy		Athens	TN	37303	615-745-6918	5531E	3599A	7692D	
3054	Visimetrics Inc	80	Earhart Dr		Amherst	NY	14221-7804	716-634-5488	3541	3599D		
3055	Visual Check International				Fresno	CA	93650	209-432-6043	3825			
3056	Voell Machinery Co		Po Box	2103	Waukesha	WI	53187-2103	414-786-6640	3541	3599E	3553	
3057	Vogelsang Corp	1790	Swarthmore Ave		Lakewood	NJ	08701-4528	908-364-0444	3469			
3058	Vulcan Industries Inc	432	Northboro Rd		Marlborough	MA	01752-1823	508-481-2406	3444			
3059	Vws Mfg Inc	16178	Front Ave		Atwood	CO	80722	970-522-2859	3052	3599A	7692D	
3060	W & H Machine Shop		Trout Run Rd		Saint Marys	PA	15857	814-834-6258	3599A	1761	7692D	
3061	W & W Tool & Die	1508	E Grove St		Midland	MI	48640-5299	517-835-5522	3544D	3599A	3544E	
3062	W A Vorpahl Inc	526	Lambeau St		Green Bay	WI	54303-4788	414-497-7200	3999	3569E	5084J	
3063	W D Tool Engineering Co	3128	W Grand Ave		Chicago	IL	60622-4387	312-638-2688	3599A			
3064	W E S S Co	4895	Joliet		Aurora	CO	80015	303-373-0990	3829C	8711	3699C	
3065	W S W Industry Inc	2161	Mogadore Rd		Kent	OH	44240-7261	216-678-1201	3599			
3066	Wachtel Mechanical Svces Corp	162	5th Ave		New York	NY	10010-5902	212-229-9300	3999	3569E		
3067	Wade Machine	10039	Canoga Ave		Chatsworth	CA	91311	818-882-1120	3599A			
3068	Wagner Machinery Co	798	S Monterey Park		Los Angeles	CA	90065	213-261-1191	3599E			
3069	Walker & Son Inc/P G	1400	W College St		Springfield	MO	65806-1610	417-862-1745	1311	3548B	7692	5084I
3070	Walker Machine Products Inc	459	Washington St		Collierville	TN	38017-2749	901-853-2611	3451			
3071	Walker Screw Machine Repair & Salvage		Dink Ashley Rd		Timberlake	NC	27583	910-364-2153	3599D			
3072	Wallace Co Inc		Hwy	347	Nederland	TX	77627	409-722-3403	3569			
3073	Wallus Screw Machine Products	1	Saint Marks Pl		Linden	NJ	07036-1996	908-486-0201	3451			

3074	[redacted]	[redacted]	[redacted] Box	[redacted]	Tomball	TX	77377	713-351-7007	3599A			
3075	V[illegible]ools Equip Inc	615	E Edwardsvl Rd		Wood River	IL	62095	618-259-5133	3545			
3076	Wa[illegible]ervices Inc	40	W Howard St		Pontiac	MI	48342-1280	810-338-3381	3291			
3077	Wangs International Inc/Showro	230	Spring St Nw		Atlanta	GA	30303-1051	404-524-2633	3999D	5199	5199G	
3078	Warner A R Enterprises	701	Depot St		Latrobe	PA	15650-1620	412-539-9229	3544D			
3079	Waters Custom Machining	3330	E Highway	80	Mesquite	TX	75149-1101	214-285-7130	3599A			
3080	Waukesha Specialty Co				Darien	WI	53114	414-724-3700	3599A			
3081	Wayland Taylor Inc	815	9th		Odonnell	TX	79351	806-428-3245	3523	5261C	5511B	
3082	Wb Tooling	9612	Humboldt Ave S		Minneapolis	MN	55431-2629	612-881-2027	3469	3544D		
3083	Wean United Inc	347	Park Ave		Warren	OH	44481	216-841-7200	3547			
3084	Wear-Ever Design & Mfg	514	Lemon St		Vallejo	CA	94590-7243	707-554-6191	3599A			
3085	Weaver Diversified Machining	115	Eastman Ave		Gadsden	AL	35901-8218	205-442-3262	3544D			
3086	Weaver Industries Inc	201	Industrial Ct		Conroe	TX	77301-4029	409-539-2156	3624	3599A		
3087	Weaver Machine Co	1430	Oregon Ave		Long Beach	CA	90813-1427	310-437-4912	3599A			
3088	Weber Bros & White Metal	4715	136th Ave		Hamilton	MI	49419-9722	616-751-5193	3599A	3399		
3089	Weber Drilling	1240	S Gregory Ln		Jackson	WY	83001	307-733-3343	3541C	5084G	3599E	5082H
3090	Webers Mach Shop Special General Machinin	2	Campbell Ave		Troy	NY	12180-6004	518-272-8033	8731B	3599A	3541	
3091	Webster Tool & Die Mfg Co	164	Orchard St		Webster	NY	14580-3283	716-872-5650	2399	3699C	3599A	3444
3092	Weemmco Mch Shop	111	Nw 14th St		Grand Prairie	TX	75050-5234	214-264-7211	3599A			
3093	Weimer Tool Co	1046	E Hyde Park Blvd		Inglewood	CA	90302-1802	310-672-5205	3599A			
3094	Weisbecker Wm J Inc	227	Little Falls Rd		Cedar Grove	NJ	07009-1223	201-239-7075	3599A			
3095	Weissman The	4927	N Damen Ave		Chicago	IL	60625-1414	312-506-2215	3531G			
3096	Wells Casting Co	5700	Walnut		Richmond	IL	60071	815-678-2811	3363	3364	3599	
3097	Wells William H		Spur Hy		Kenai	AK	99611	907-283-7521	5211	5075	5033	3498
3098	Wellsbuilt	2369	Dickerson Rd		Reno	NV	89503-4905	702-324-3755	3599A			
3099	Weltek Manufacturing Inc	2751	W Oxford Ave		Englewood	CO	80110-4364	303-781-6613	3599A	3451		
3100	Wendell Trepanning Inc	15120	Garfield Ave		Paramount	CA	90723-4020	310-634-9035	3599A			
3101	Wendells Mach & Mfg	1262	Lancaster-Kirkersville Rd Nw		Lancaster	OH	43130	614-653-1900	3599A			
3102	Wendig Automotive Inc	671	N Main St		Doylestown	PA	18901-3924	215-343-4710	3714	7538C	5531	
3103	Wensel Metals	1	Lloyd Ave		Latrobe	PA	15650-1701	412-532-1677	3469			
3104	Wentworth Mold & Die Usa Co Lt	365	John Downey Dr		New Britain	CT	06051-2907	203-225-3511	3544E			
3105	Wesley Weehunt Drilling & Pump Service		Bookout Rd Nw		Tularosa	NM	88352	505-585-2096	3541C	5084G	3599E	5082H
3106	Wesner Assocs	21	Main St		Darby	PA	19023-3043	610-532-8047	3599A			
3107	West Co	347	Oliver St		Jersey Shore	PA	17740-1999	717-398-1133	3089			
3108	West Coast Fabricators	17360	Sw 63d Ave		Lake Oswego	OR	97035	503-635-7333	3399			
3109	West Gate Sheet Metal Inc	834	W 13th Ct		West Palm Beach	FL	33404-6727	407-845-2440	1761	5551	1791D	5722
3110	West Machine Shop Inc		Hwy 8 E		Cleveland	MS	38732	601-843-5109	3599A	3599E	7692D	
3111	West Michigan Tool And Die	1007	Nickerson		Benton Harbor	MI	49023	616-925-0900	3544D			
3112	Westchester Tool Supply Corp	1051	Saw Mill River Rd		Yonkers	NY	10710-3213	914-965-4411	3569	3545		
3113	Western Die Cut Contractor Inc	3650	E 41st Ave		Denver	CO	80216-6502	303-355-5153	3999L	3087		
3114	Western Foundry & Machine Works	1801	Madison		Topeka	KS	66600	913-235-6030	3365	3441		
3115	Western Grinding Service Inc	601	Harbor Blvd		Belmont	CA	94002-3924	415-591-2635	3541H	3451	3599A	
3116	Western Industrial Machining	211	24th St		Westminster	MD	21157-5501	410-857-9161	3599A			
3117	Western Industrial Supply Co	1220	W 15th Ave		Amarillo	TX	79102-2613	806-376-5467	7359E	3498	5083J	
3118	Western Lithotech-Texas	2034	N Jackson St		Jacksonville	TX	75766-5136	903-586-9866	3354			
3119	Western Mold Engineering Inc	11726	E 166th		Artesia	CA	90701	310-865-2459	3544E			
3120	Western Motor Parts	1588	San Pablo Ave		Pinole	CA	94564-2452	510-724-1412	7538C	5531		
3121	Western Pumping Systems Inc	17046	S Weber Dr		Chandler	AZ	85226-4113	602-961-0150	3599E			
3122	Western States Drilling	9229	Redwood Rd		West Jordan	UT	84088-6570	801-567-0993	3312			
3123	Western States Equipment Co	323	N Canyon Blvd		John Day	OR	97845-1152	503-575-1301	5082	3523	2411	7538A
3124	Westlake Drilling	184	N 7th St		Montpelier	ID	83254-1475	208-847-1518	5082H	3541C	5084G	
3125	Westmoreland Industrial Supply Co		Rt 30 E		Greensburg	PA	15605	412-834-0800	3291	3569		
3126	Westwater Supply-Springfield I	30	Walnut St		Springfield	OH	45505-1145	513-325-2434	1711	5074D	5075	3498
3127	Westwood Manufacturing Icn	1	30th St Nw Ste	1	Auburn	WA	98001-1711	206-833-8241	3599A			
3128	Westwood Tool	1500	Leander Dr		Leander	TX	78641-2042	512-259-4099	3544D			
3129	Wheatons Sheet Metal Shop Inc	1020	Craft Rd		Ithaca	NY	14850-1016	607-257-5555	3823			
3130	Wheco Corporation		Big Pasco Industrial Park		Pasco	WA	99302	509-544-0933	3536	3599E	3594A	
3131	Wheeler Boyce Co	4545	Boyce Parkway		Akron	OH	44310	216-686-1292	3999A	3544E		

3132	Wheeler Electric Inc	820	W 1st Ave		Eugene	OR	97402-4902	503-687-2121	7694	769	1731	3599E
3133	W[illegible]m Porter T	2060	W Kelly Park Rd		Apopka	FL	32712-5129	407-886-8111	5084D	35		
3134	W[illegible] Tool & Die Corp		College Hwy		Southwick	MA	01077	413-569-5528	3544D			
3135	White Star Machinery & Supply Co	3184	Hall Ave		Grand Junction	CO	81504-6036	970-434-0647	5032C	7699P	3699C	7359
3136	Whiteco Machine Inc		School Rd		Jacksboro	TN	37757	615-562-1111	3599A			
3137	Whites F W Machry Co	1820	Cedarhurst Dr		Wickliffe	OH	44092-1100	216-585-2500	3545	3541		
3138	Whites Machine Shop Inc	343	N Clifton Ave		Springfield	MO	65802-4611	417-866-3737	3599A	7692D		
3139	Whites Water Well Drilling & Repair				Fort Pierce	FL	34950	407-464-4787	4971	3599E	5083J	1781
3140	Wickford Corp Of Nj	128	Buckingham Ave		Trenton	NJ	08618-3314	609-393-3000	3291			
3141	Wiegand Edwin L-Chromalox	6463	Proprietors Rd		Worthington	OH	43085-3263	614-885-3933	3829	5075B	5099C	3567
3142	Wil-Mar Hydraulics & Mine Supl		Highway 41 N		Hanson	KY	42413	502-322-8654	3594A	3569	3599A	
3143	Wilco Die-Tool-Machine Co	2430	Northline Ind Blvd		Ladue	MO	63124	314-872-9252	3599A			
3144	Wilcoxon Enterprises Inc	520	Washington St		West Monroe	LA	71292-6549	318-388-1896	3479D	5211O	1791D	5051D
3145	Wilder Motor & Equip Co Inc	301	15th Ave N		Nashville	TN	37203-2988	615-329-2365	5084L	3714	3621	5084G
3146	Wiley Water Systems Inc	6455	E Jackson St		Muncie	IN	47303-4526	317-284-9484	5084G	3599E	4941	1781
3147	Wilkins Pipe & Supply Co	8515	N University St		Peoria	IL	61615-1672	309-692-9550	3498	5211D	5023P	3494
3148	Wilkinsons Custom Drive Shaft	2252	State Rd 52 W		West Lafayette	IN	47906	317-497-3463	3714B			
3149	Will-Mor Engineering Co Inc	53	Batchelder Rd		Seabrook	NH	03874-4402	603-474-8971	3599A			
3150	Willamette Fluid Power	8895	Pueblo Ave Ne		Salem	OR	97305-9712	503-463-0758	3599E	3594A		
3151	William Hough Jr Mch	2387	W Cohoctah Rd		Howell	MI	48843-9342	517-546-0844	3599A			
3152	Williams Bros Div Of Brookline Machine	296	Warren Ave		Portland	ME	04103-1107	207-878-2994	3714B	3594A	5551	1623
3153	Williams Engineering & Mfg Inc	21610	Lassen		Chatsworth	CA	91311	818-882-4800	3599A			
3154	Williams Machine Shop	7602	George Washington Mem Hwy		Grafton	VA	23692-4851	804-898-9167	7538U	5531	3714	
3155	Williams Machine Works Inc	5725	Main St		Moss Point	MS	39563-2255	601-475-7651	3599A	3731	3441	
3156	Williams Manufacturing Co	30707	Commerce		New Haven	MI	48048	810-749-6800	3469			
3157	Williams Motor Parts	603	W 2nd St		Freeport	TX	77541-5790	713-233-5313	5531A	3691	3494	5531B
3158	Williams R E Co Inc	3625	Eggert Rd		Orchard Park	NY	14127-1946	716-667-7044	3531G			
3159	Williams Truck Parts Inc	403	Airport Dr		Shreveport	LA	71107-7007	318-221-0601	3714	3714B	1623	3568
3160	Willington Auto Body Inc		Route	32	West Willington	CT	06279	203-429-8595	7532	3559M		
3161	Willow Creek Tool Sales		Main		Willow Creek	MT	59760	406-285-3734	3545			
3162	Wilpak Plastics Inc	244	Dukes St		Kearny	NJ	07032-3929	201-997-8863	3021	3089	3085	3052
3163	Wilson Tool Service	2134	Presidential Row		Mesquite	TX	75149-1125	214-288-8644	1389B			
3164	Wilsons Machine Shop	5230	N County Rd 300 E		Mount Summit	IN	47361	317-836-4565	3599A			
3165	Wilsons Tool & Cutter Servcie	1013	Se	38	Oklahoma City	OK	73129-6855	405-672-5497	3541H	7699D		
3166	Windmill Construction Machiner	9791	Brighton Rd		Henderson	CO	80640-8631	303-286-9282	3599E			
3167	Windsor Airmotive Barnes Group	7	Connecticut South Dr		East Granby	CT	06026	203-653-5531	3599A			
3168	Winfield Door Control	263	S Whitford Rd		Exton	PA	19341-2637	610-363-1010	3823	7342	9511	3822
3169	Winfields Machine Repair Inc	29761	Groesbeck Hwy		Roseville	MI	48066-1923	810-771-0010	1796B	3599E		
3170	Winkco Machine Works	11318	Hirsch Rd		Houston	TX	77016-1738	713-442-3383	3599A			
3171	Winnelson Co	1000	Elk St		Rock Springs	WY	82901-4524	307-382-5730	5075	3569	3498	3088
3172	Winter Turbos	1640	Dockery Ave		Selma	CA	93662-9785	209-896-9621	3699D			
3173	Wisconsin Air-Cooled Engine Agcy	323	E Louisiana St		Evansville	IN	47711-5021	812-422-9418	5084L	3724		
3174	Wisconsin Metal Products Co	1807	De Koven Ave		Racine	WI	53403-2543	414-633-6301	3469			
3175	Wise Tools & Die		Main		Stamping Ground	KY	40379	502-535-6140	3544			
3176	Witco Inc	6401	Bricker Rd		Avoca	MI	48006-2521	810-387-4231	3599A			
3177	Witherspoon Grinding Servic	2	W Spring St		Covington	OH	45318-1324	513-473-5358	3541H			
3178	Woehr Tool & Die	130	Lewis Rd		San Jose	CA	95111-2135	408-227-2515	3469			
3179	Wolcott R & Sons	23	Cindyla		Deal	NJ	07723	908-493-8610	3599A			
3180	Wolf Machine Inc	129	N Marquette Rd		Prairie Du Chien	WI	53821-1512	608-326-2925	3599A	7692D		
3181	Wolfe Brothers Construction		Rr	3	Marion	VA	24354-9803	540-783-2715	1541	1794	1611J	3443A
3182	Wolfe Manufacturing Co	2974	Airport Hwy		Toledo	OH	43609-1404	419-382-9571	3451			
3183	Wolter A	7751	S 76th St		Franklin	WI	53132-9758	414-529-0640	3291	5499A		
3184	Wolverine Production & Engineering Co	40851	Production Dr		Mount Clemens	MI	48043	810-468-2890	3541B			
3185	Womack Machine Supply Co	9440	Viscount Blvd		El Paso	TX	79925-7049	915-598-0288	3829	3594A	5072D	
3186	Woman Power Inc	809	1st Ave		Asbury Park	NJ	07712-5942	908-775-8010	3699			
3187	Woodbury-Beach Co Inc	803	S Van Buren St		Little Rock	AR	72204-1841	501-663-9421	5074D	1711E	3443	7699J
3188	Woodland Machinery Co	1103	Nelson Ln		Port Bolivar	TX	77650	409-684-5926	3599E			
3189	Woods Machine Services Inc	1321	S Church St		Rocky Mount	NC	27803-3606	919-446-2142	3536	3599A	7692D	

3190	W[illegible] Custom Engine Rebuilding	1633	E Miner Ave		Stockton	CA	95205-4538	209-943-5685	7538C	75	7538U	3599A
3191	W[illegible]ling Unlimited Inc	321	North Loop E		Houston	TX	77022-5931	713-694-6139	3599D			
3192	Wor[illegible] Screw Machine Products Office		Highway	72	Paint Rock	AL	35764	205-776-3355	3599A	3451		
3193	Worthington Associates	7509	Douglas Ave Ste	20	Urbandale	IA	50322-3067	515-278-0635	3544B			
3194	Wright Steel Co	20	Chemical Way		Redwood City	CA	94063-2715	415-368-4112	3541	3441	7692D	
3195	Wright Tool Co	1738	Maplelawn Dr		Troy	MI	48084-4604	810-643-6666	3569			
3196	Wrights Electrical Contracting	273	Ben Hill Rd		Thomaston	GA	30286-9653	706-647-2210	3599K			
3197	Wrights Welding & Propeller Shop	2024	Aetna Rd		Ashtabula	OH	44004-6260	216-998-7244	3732	3724	7692D	
3198	Wyley-Elliott Company The	1000	S Washington		Washington	AR	71862	501-234-3365	3542			
3199	Xomox Corp	759	Galway Dr		Ballwin	MO	63021-7117	314-394-9499	3494			
3200	Y & S Tool	3009	Production Ct		Vandalia	OH	45377	513-890-4322	3363	3354		
3201	Yale Tool & Engraving Inc	1471	Gold Smith Ave		Plymouth	MI	48170-1082	313-459-7171	3316	5944Z	3599A	
3202	Yamazen Usa Inc	8930	Bash St		Indianapolis	IN	46256-1285	317-579-7220	3545			
3203	Yardley Manufacturing Co Inc M	114	S Main St		Yardley	PA	19067-1620	215-493-2975	3494	1761		
3204	Yoachim Machinery Co Inc	4627	Independence Sq		Indianapolis	IN	46203-5942	317-788-1501	3541	5084D		
3205	Yoder Die Casting				Dayton	OH	45432	513-427-5885	3363			
3206	Yornell Tool & Mold Inc	15	Morgan St		Crystal Lake	IL	60014-4468	815-459-9110	3544			
3207	Youells D D Machining Inc	4529	Bethlhn Pke		Telford	PA	18969	215-257-4109	3599A			
3208	Youngstown Plastic Fabrication	1033	Poland Ave		Youngstown	OH	44502-2138	216-743-6404	3087	3089		
3209	Your Pal Inc	8540	I St		Omaha	NE	68127-1616	402-339-4477	3599A			
3210	Yuasa International	10715	Springdale Ave		Santa Fe Springs	CA	90670-3833	310-941-8822	3541			
3211	Z & Z Precision	14539	Blythe St		Van Nuys	CA	91402-6013	818-786-8631	3599A			
3212	Zalk Steel & Supply Co	446	Saint Anthony Blvd		Minneapolis	MN	55418-1141	612-781-6801	3452	3462	3479E	
3213	Zeiger Industries	4704	Wiseland Ave Se		Canton	OH	44707-1054	216-484-4413	3599A			
3214	Zep Manufacturing Co	13606	E Pumice		Santa Fe Springs	CA	90670	310-921-0338	5169	3291	3589	
3215	Zillners Tool & Die Co Inc	430	Spruce St		Sheboygan Falls	WI	53085-2542	414-467-2476	3544D	3599A		
3216	Zinola Mfg	1190	W Evelyn Ave		Sunnyvale	CA	94086-5742	408-739-7974	3599A			

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MACHINE TOOL ADVANCED SKILLS
TECHNOLOGY PROGRAM (MAST)

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MAST Partners' Meeting
Report of October 10 - 11, 1995 Meeting

The MAST Partners' Meeting was held on October 10-11, 1995 and hosted by Moraine Valley Community College. Mr. Joe Penick, Project Director, chaired the meeting.

Attendees:

Texas State Technical College:
Joe Penick, Project Director
Dr. Don Pierson, MASTER Principal Investigator
Wallace Pelton
Terry Sawma

Itawamba Community College:
Barry Emison

Augusta Technical Institute:
Ronnie Lambert

San Diego City College CACT:
Dr. Joan Stepsis
Jack Bollinger

Springfield Technical Community College:
Gary J. Masciadrelli
Nick M. Massa

Moraine Valley Community College:
Richard Kukac
Dr. Richard Hinlcley

Joe Penick called the meeting to order at 8:30 A M. on October 11, 1995 at Moraine Valley Community College and distributed copies of the MAST Deliverables Schedule and Volume # 4 (draft) to all in attendance. The agenda for this meeting was included in the MAST Deliverables Schedule.

1. **Partner College Occupational Specialty Matrix:**

   The Partner College Occupational Specialty Matrix was amended to reflect the Lead Institution and the secondary college for each of the occupational specialities. A copy of the amended matrix is attached. The lead institution is responsible for the development of competency profiles, outlines, SCANS matrix, Technical Workplace Competencies/Course matrix, and course syllabi, etc. as outlined in the draft Volume # 4 - Machining book. The secondary college will review all documents produced by the lead institution.

2. **MAST Project Gantt Chart: October 1, 1995 - September 30, 1996**

   Joe Penick presented the MAST Project Gantt Chart for review and comment. It was suggested and agreed that items # 15 and 16 (Steering Committee Review of Final Project and Final MAST Partners' Meeting at TSTC) be combined and occur on September 15, 1996.

3. **MAST Project Deliverables (Formats and Assignments): Volume 4 - Machining**

   Wallace Pelton presented the proposed MAST Project Deliverables Format from page 44 of the MAST grant and the dissemination plan (see MAST grant). The MAST Bound Deliverables format and assignments were also presented. Wallace outlined each volume of the fifteen volume set of deliverables and identified the responsible College Partner and date due at TSTC as January 31, 1996. Each volume shall follow the order shown in draft volume #; will be prepared by the lead # 1 college partner indicated on the revised occupational speciality matrix; follow the sample "Volume 4 - MACHINING"; be submitted in both clean, original hard copy and on disk (Word Perfect or Word for Windows format for all text and/or PageMaker files for Competency Profiles and Crosswalks). A copy of the amended MAST Bound Deliverables (Formats and Assignments) is included in this report. Wallace requested all partners contribute appropriate documents for Volume # 2 be sent to Terry Sawma for compilation before December 31, 1995.

4. **Memorandum of Agreement: MAST**

   Joe Penick requested that each college partner prepare a MAST Memorandum of Agreement (MOA) or use the current two (2) year MOA. He requested each partner send copies of the signed MAST MOA to TSTC. The MAST Deliverables Schedule contains a sample MOA that may be followed in preparing the MAST MOA.

5. **Claims and Blanket Contract with Partners:**

   Joe Penick outlined the protocol for college partner reimbursement requests. He identified key points in Texas Public Law that may affect MAST reimbursement protocol.

6. Memorandum Ref: State of Texas Per Diem Allowance for Chicago Trip:

Joe Penick identified the State of Texas per diem allowance for this Chicago trip at a maximum of $104.00 per day for lodging, $38.00 per day for meals, and a millage reimbursement rate at $0.28 per mile. Requirements for reimbursement were defined and a State of Texas Travel Voucher was included in the MAST Deliverables Schedule distributed to all participants.

7. Quarterly and Annual Reports:

Terry Sawma presented the MAST Quarterly Report Summary of Activities and Events for July 1, 1995 - September 30, 1995. All MAST College Partners are requested to send copies of their Quarterly Reports Summary of Activities and Events to Terry Sawma within 30 days of the end of a quarter. Terry Sawma outlined the Annual Report Format, required by the Department of Education. Each partner college shall submit an annual report to the MAST Project Director by November 15, 1995 for inclusion in the Final Annual Report that will be submitted to the Department of Education. Please send your annual reports to Joe Penick.

8. Survey Data:

Terry Sawma announced that the Texas Industrial Survey has been mailed to over 340 industries in the state. He presented the survey cards and introductory letters to industry. Dr. Joan Stepsis suggested that industries participating in the National Survey be selected randomly and that TSTC coordinate the process. Partners agreed that TSTC shall randomly select the industry participants from a national data base, write the introduction letter, prepare all mailings, and prepare the statistical analysis of the data.

The meeting concluded with a tour of the Technology Building at Moraine Valley Community College. The meeting was adjourned at 3:30 pm on October 11, 1995.

Submitted by:

Wallace Pelton

Wallace Pelton
MAST Site Coordinator
Texas State Technical College

Enclosures:

MAST Partner College Occupational Speciality Matrix

MAST Partner College
Occupational Speciality Matrix

Speciality	TSTC	Itawamba	Augusta	Moraine Valley	CACT	Springfield
Manufacturing Engineering Technology Machinbing EDM Superabrasives Mold Making	1	2				
Welding	2			1		
Industrial Maintenance			1	2		
Sheet Metal/Composites	1				2	
Tool and Die	2	1				
Computer Aided Drafting (CAD)		2	2	1		
Computer Numeric Control (CNC)/CAM		2	2		1	2
Instrumentation			1		2	
LASER Machining	2					1
Shop Floor Control /CIM/Flexible Machining				2	1	
General Education	1					

1 = College with Primary Responsibility
2 = College(s) with Supporting Responsibility

Each partner college has the responsibility to review all documentation for each of the occupational specialties.

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Texas State
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Waco

MAST Partners' Meeting
San Diego, California
November 16, 1995

The meeting was hosted by San Diego City College in San Diego, California. The meeting actually began at 6:30 p.m. due to some confusion regarding meeting rooms.

Attendees:
Dr. Hugh K. Rogers, Central Florida Technical College; Dr. Jim Hales, Consultant; Jim Weaver, Augusta Technical Institute; Nick Massa, Springfield Technical Community College; Dr. Joan Stepsis, San Diego City College; Jack Bollinger, San Diego City College; Mary Benard, San Diego City College; Doug Welch, San Diego City College; Wallace Pelton, TSTC Waco; Joe Penick, TSTC Waco.

Introduction

The meeting was chaired by Joe Penick using the second peach colored book, "Executive Session". During the meeting, Mr. Penick reviewed what had taken place at Chicago (the meeting of the worker bees discussing the peach colored book, volume 1, "Deliverables Schedule for MAST"). There were some changes to the first peach colored book, and Joe had rearranged that material and put that into the second peach colored book, the Executive Session.

The Meeting

The agenda was reviewed discussing the occupational specialities, the Gantt charts and the deliverables; and since this was the first meeting with the Drs, Joe showed them the different formats and some assignments that were made and specifically the volume 4 machine book.

Joe also talked a little about the MOA's for MAST, the goals for MAST and MASTER and claims and contracts and the per diem allowance, etc.

He ended this section talking a little about the survey and telling them the new plan for the survey with TSTC's MAST office actually doing all the work in Waco and touched on the TRP subgrants. After the discussion on MAST, the second part of the meeting began talking about MASTER.

For MASTER, Joe used a green book, "Operational Plan", the same book we had used in Ft. Worth for the meeting with the NSF, Dr. Agrawal, and with the Steering Committee. Basically, Joe talked a little about what had happened in that meeting and some of the discussions that they had and some of the deliverables and went through some of those things. This was the first time most of these people had addressed the MASTER Grant specifically as far as deliverables, etc.

Closing

At the close of the meeting, the floor was opened for general discussion and Joe mentioned to the partners that he wanted to give each partner college the equivalent of three $2,000 scholarships and they could use this to help fund students in their pilot program or this money could be used to purchase books or whatever the individual colleges want, but he wanted each of the colleges to have the equivalent of $6,000 extra up and above their MOA money that had already been promised and they could use this to work with their scholarship there.

Submitted by:

Joe Penick

Joe Penick
MAST Project Director

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Texas State
Technical College
Waco

MAST Partners' Meeting
Moraine Valley Community College
Chicago, IL
January 19, 1996

Attendees: Dr. Don Pierson, Joe Penick, and Wallace Pelton, TSTC Waco; Barry Emison, Itawamba; Dr. Joan Stepsis, Jack Bollinger, and Mary Benard, The CACT at San Diego; Carson Berglund, technical writer; Dr. Hugh Rogers, Central Florida Community College; Rich Kukac, and Dr. Dick Hinckley from Moraine Valley Community College; Bill Ruxton, Evaluator; Nick Massa and Gary Masciadrelli, Springfield Technical Community College.

DISCUSSION ITEMS

MAST deliverable items were discussed. Mr. Penick used the booklet, "Deliverables Formats and Schedules" (ivory) to cover each section:

1. Discussion on Project Deliverables

2. Deliverables Schedule Gannt Chart

3. Career Orientation Module (8-hour career enhancement tour and 172 hours of basic training in machine tool. This could be used for secondary school students. Mr. Penick offered the partners funds to prepare a recruitment video for each of their schools.

   Jack Bollinger, San Diego, has developed a 200-hour basic course for secondary school students which would fill the bill for this part of the grant deliverables on career orientation. This is being used at San Diego for the Continuing Education program. Some copyright matters need to be dealt with, but he would look at the possibility of sending this to the TSTC MAST office.

4. Remote Site Training Materials. Mr. Penick showed an example of the MAST Remote Site Training module. Each partner was asked to develop one module for their occupational specialty area(s). Due date for these modules is mid-February. These modules will be included in a Remote Site Training Model package. The package is being

developed by Mr. Dewey Cooper in Waco. The entire remote site package will serve as a model to be used by colleges for marketing the MAST training modules to industry.

5. Career Action Plans. Mr. Sefcik is in Waco working on these. The rough drafts were shown to the group and comments were solicited.

6. Internship Agreement. Mr. Penick presented the contract agreement that Terry Sawma had worked up for us. With a little revision by Mr. Penick, it is well under way.

7. Executive Summary. Mr. Penick introduced Carson Berglund, a technical writer associated with San Diego. Mr. Berglund distributed copies of the rough draft to the group and several points were discussed. Some information from Dr. Rogers regarding how the MAST program was started and how the partnership was formed was requested. Each partner was requested to get information to Mr. Berglund so that he could include that in the foreword sections of each volume. Mr. Berglund will come up with a list of questions and fax it to each partner. The responsible partner will answer the questions and then return them to Mr. Berglund. The forewords will be created from this information.

8. Career Awareness Video. This is not mandatory, but $5,000 is available for each of the schools if they wish to do a regional career awareness video.

9. Packaging Instructions. Format instructions for the books were discussed.

10. Industry-Wide Assessment of Skills. Mr. Penick presented this to the group again and emphasized the need for more industry visits to validate our competency profiles. Many of the visits need to be done by TSTC Waco; there is not enough information on sheet metal or composites. Mr. Penick and Mr. Pelton will arrange trips for each of those areas.

11. Pilot Program. Of the five key MAST goals, two of them deal with the pilot program. Mr. Penick talked about the different types of students that were in our pilot programs and at the conclusion of the discussion, he described two worksheets to use to help summarize the program for each partner. One was a MAST pilot program student assessment results analysis. Consisting of the types of students: disadvantaged, non-traditional, traditional students; how many started; how many finished; information on the pilot tests, the entry tests and scores, etc.

    The second document reviewed was a brief description giving the name of the college, overview of the program, how the students were selected, how they applied, funding, apprenticeship, etc.

12. Some partners need to submit their MOA's and State of Texas Contracts.

13. Information for per diem and travel was presented.

CONCLUSION

The meeting was positive, a lot of information was covered, and we look forward to receiving deliverables documentation at TSTC. At the meeting, Springfield Technical College submitted their book on Laser Machining. Two books on CNC and Automated Equipment Technician were received from San Diego.

Submitted by:

Joe Penick

Joe Penick
MAST Project Director

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MAST Partners' Meeting
Orlando, Florida
April 24-26, 1996

The final MAST Partner Development Centers Meeting was held in Orlando, Florida and hosted by Central Florida Community College and Dr. Hugh K. Rogers. Meetings were held in the morning hours and tours relative to MAST were scheduled for the afternoons.

Attendees:
Dr. Hugh K. Rogers, Central Florida Community College; Nick Massa and Gary Masciadrelli, Springfield Technical Community College; Dr. Joan Stepsis, Mary Benard, Doug Welch and Jack Bollinger, San Diego City College; Ronnie Lambert and Steve Griggs, Augusta Technical Institute; Don Benjamin, and Barry Emison, Itawamba Community College; Chuck Bales, Moraine Valley Community College; Dr. Hales, Formative Evaluator; Bill Ruxton, Summative Evaluator; Joe Penick, Dr. Don Pierson, and Wallace Pelton, TSTC Waco.

April 25, 1996 Discussions
The agenda/meeting book , "Final MAST Partners Meeting" (coral color cover) was used.

The MAST first draft deliverables, a 15-volume set, was taken to the meeting for partner review. Partners will review and send revisions to the MAST office by May 15, 1996.

The deliverables time line was reviewed (Tab B) and Mr. Penick reported that we are right on schedule and that he needed to do a little more work the dissemination. The Dissemination Model is in first draft form now. A trip is planned to Washington, DC to meet with the project representatives to discuss the plan for deliverables. The model will be complete prior to that trip.

Mr. Penick also emphasized the need for the partners to reconcile their expense vouchers and that he will be calling each partner to discuss the spending line for the remainder of this fiscal year. There was some discussion about the pilot program, the need to wrap it up, and to get the post test done for the students. The results should be received in the MAST office before the final dissemination process.

Minutes
Minutes for previous meeting (Tab C) were discussed.

Quarterly Report

The Quarterly Report was discussed.

Match for equipment, personnel, etc.

There was some discussion.

Tab E

Forms were presented as examples of how matching could be written up and submitted.

Tab F - Discussion of Suspenses

Review of 15-volume sets and submit changes.
Do complete reconciliation for cost and invoices.
Submit all invoices for MAST.
Regional recruiting videos (Springfield and Augusta) submitted to MAST office.
Matching - get documentation done.
For Non-Matching federal costs - must have time and hours for all employees.
Pilot Program & Student Assessment.
Final Industry Visits, if any, turn in competency profiles.

April 26, 1996 Discussions

Dr. Hales emphasized evaluation of the pilot programs. Need photos of the pilot program for record. Send to the MAST Program office.

Need to complete Sheet Metal and Composites curricula. Also need to do more industrial assessment in the form of modified DACUMS/Competency Profiles. Need input from all Partner Development Centers.

Submitted by:

Joe Penick

Joe Penick
MAST Project Director

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PROJECT REPORT
FIRST QUARTER
JANUARY 2, 1995

1. The MAST program was funded October 1, 1994. It provides for TSTC Waco as lead institution, with five other developmental institutions. These are: San Diego City College, Augusta Technical Institute, Moraine Valley Community College, Itawamba Community College and Springfield Technical Community College.

2. The grant award from the Department of Education was first announced by U.S. Representative Chet Edwards from Texas. An "Open House" and announcement to the local community was made at TSTC on October 17. (Each out-of-state Center has also made announcements to the media.)

3. The first meeting of the Steering Committee was also held on October 17, when goals, objectives, and methodologies to be used for the project were discussed, followed by a tour of TSTC facilities Industrial Technology building. (Steering Committee meetings were also held in a similar fashion at the out-of-state locations.)

4. The Project Manager met with Mr. Bill Ruxton, one of the evaluators at his office at NTMA, Ft. Washington, Maryland. Project goals and concepts were discussed, along with evaluative information. Mr. Ruxton was most helpful in providing comparative and background information.

5. Three presentations were made to TSTC faculty involved in the career programs. Centers followed a similar program of information to their faculty.

6. Industry partners and public school partners were contacted and visits began. Initial visits were made to Time Manufacturing, Mercury Tool and Die, Bell-Textron, and Alcoa.

7. Letters of Agreement for the scope of work were received from all Centers and Centers assigned the equivalent of two full-time personnel to work on the project. Local project work was done by the Project Manager and existing TSTC staff until full-time personnel could be recruited. New project personnel at the Waco Center were recruited in November, interviewed in December, and would begin work in January.

8. The first national meeting of the Centers was held at CORD in Waco on November 18. Project goals, objectives, and methodology were discussed, as well as a review of literature on skills standards. A presentation was made on comparative projects involving other disciplines; formats for gathering skills standards information; affirming it with industries; and designing the final product. It was decided that a standard format would be best and that we needed a software product to meet that need. Centers were also encouraged in their efforts to work with the public schools in the early phase to promote the career action planning process for students.

9. The Project Manager traveled to the Oak Ridge National Laboratories on November 10-15, and met with the personnel in the Skills Center and Development Center, obtaining very useful information on equipment trends and skills training as applied there with employees.

10. The Project Manager also traveled to Washington, D.C. on December 5-6 to meet with the Department of Education Grants Officer, Dr. Jackie Friederich, and Grants Specialist, Ms. Juanita Bowe. Planning information, concepts, partnerships, and budget were discussed. Future meetings were also planned to include a February national meeting at Oak Ridge National Laboratories and a possible future meeting at Detroit, Michigan.

11. Locally, meetings with Bell-Textron began in October and December, with February 1-2, 1995 established for detailed work on skill standards for machinists.

12. In December, software packages were reviewed for the project and products titled "First Task" and "Course Developer" were obtained. These were sent to each development site for evaluation and training.

13. The second Steering Committee meeting was scheduled for January 20, 1995, and the second national meeting was scheduled for February 18, with two persons from each Development Center scheduled to travel there to review.

14. A second evaluator, Dr. James Hales, was brought into the project due to its scope and areas to be covered. (He and Mr. Ruxton will be present in Waco on January 20th and at Oak Ridge on February 18th.)

SUMMARY

The first quarter of the project has involved: 1) early coordination; 2) letters of agreement; 3) recruitment of new personnel; 4) first visits to schools and industry partners; 5) committee work on methodology; and (6) obtaining the proper project software for task analysis and course development. As a start-up effort, overall progress has been excellent. The second and third quarters will now show a greater rate of progress with skills standards work and deliverables for the first year's work. During this period, the Project Manager will be making on-site visits with the Centers and additional contacts with the federal laboratories.

Hugh K. Rogers
Project Manager, MAST

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Texas State
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Waco

QUARTERLY REPORT:
MAST PROGRAM SUMMARY OF ACTIVITIES AND EVENTS:
JANUARY 1, 1995 - MARCH 31, 1995

TEXAS STATE TECHNICAL COLLEGE:

MAST STEERING COMMITTEE MEETING January 20, 1995

Dr. Rogers, Dr. Botsford, and Dr. Groves hosted a MAST Steering Committee meeting in the IDEAS Center at TSTC and presented an overview of the MAST program with representatives from industry, secondary education, post secondary education, and external evaluators (Dr. James Hales and Mr. Bill Ruxton). The overview included identification of the skills standards movement; partnerships with industry and secondary schools; project activities timeline; and a tour of the Industrial Technology building, CAD/CAM, Machining, and Manufacturing Programs.

BELL HELICOPTER TEXTRON February 1, 1995

Dr. Rogers, Dr. Botsford, and Wallace Pelton were hosted by Bell Textron's Mr. Lucien Rouze and described the objectives of the MAST program. Partnerships between Bell and TSTC were discussed. A tour of the facilities was provided.

BELL HELICOPTER TEXTRON February 10, 1995

Dr. Rogers, Dr. Botsford, Wallace Pelton, and Darrell Dungan were hosted by Bell Textron. Darrell Dungan, TSTC EDIT Center, facilitated a DACUM for Machinist. Panel members are identified on the DACUM.

NATIONAL MAST MEETING,
Oak Ridge National Laboratories

February 16-19, 1995

This was the first organizational meeting of the MAST partners and was attended by Dr. Rogers, Dr. Botsford, and Wallace Pelton, TSTC. The MAST objectives were reviewed and Development Sites shared the information that had been collected to date. A tour of the facilities was provided .

CONNALLY HIGH SCHOOL VISIT

February 17, 1995

Mr. Don Hancock, Superintendent of Connally ISD, invited faculty from TSTC to present an overview of the MAST program at the Connally High School Faculty In-service. Terry Sawma and George Gray met with the faculty and counselors of Connally High School to outline the objectives of the MAST program and describe TSTC's technology programs. Faculty were asked to identify students who may be interested in the "pilot" testing of the Machinist Certificate program for the Fall 1995 semester.

CONNALLY HIGH SCHOOL VISIT

February 20, 1995

Wallace Pelton and George Gray met with the faculty and counselors of Connally High School to outline the objectives of the MAST program and describe TSTC's technology programs. Faculty were asked to identify students who may be interested in the "pilot" testing of the Machinist Certificate program for the Fall 1995 semester. George Gray and Wallace Pelton met with two classes of vocational students and describe aspects of the Machining program and the MAST program. A letter of appreciation was sent to Mr. Jones, Vocational Education Teacher, and included a MAST Program Interest Form to identify potential students for the pilot program in Machining scheduled for the Fall 1995 semester.

MARLIN HIGH SCHOOL VISIT:

February 23, 1995

Wallace Pelton met with Faculty and Counselors of Marlin High School to describe the MAST program objectives. Wallace met with all high school students, freshman through seniors, and presented information about the Manufacturing Technology degree program at TSTC. A letter of appreciation was sent to Ms. Renee Ellers, Vocational Counselor, Marlin High School.

MERCURY TOOL AND DIE

March 2, 1995

Wallace Pelton and Dr. Jon Botsford were hosted by Mr. Jack Peck, Sr. and Mr. Jack Peck, Jr.. Dr. Botsford facilitated a Competency Profile session for Machinist.

WACO HIGH SCHOOL VISIT:

March 6, 1995

Terry Sawma and Wallace Pelton met with the counselors of Waco High School to describe the MAST program and outline the "pilot" program in Machining at TSTC. Additionally, we met with the vocational instructor in auto mechanics. A letter of appreciation was sent to Ms. Penny Richardson, Counselor, Waco High School.

MAST PARTNERS LETTER March 7, 1995

Letters were mailed to MAST partners requesting information about available software, E-Mail Addresses, and mailing addresses, telephone numbers, and name of the Site Coordinator.

REED TOOL, INC., Houston, TX. March 8, 1995

Terry Sawma met with Wayne Mausbach, Manager, Manufacturing Engineering, Reed Tool Company and toured the facilities.

STEWART AND STEVENSON, INC., Houston, TX. March 9, 1995

Terry Sawma met with Mr. Mike Andrews, Vice President of Stewart and Stevenson, Inc. and toured the facilities.

DANIEL FLOW PRODUCTS, INC., Houston, TX. March 9, 1995

Terry Sawma met with Ms. Diane Young, Employment Manager of Daniel Flow Products, Inc. and toured the facilities.

ALCOA, INC., Rockdale, TX. March 14, 1995

Dr. Jon Botsford, Wallace Pelton, and Terry Sawma met with Mr. Mike Vidrine and experts in the specialities of General Mechanic (Welding), Electrician/Instrumentation, and Machinist to identify "Duties and Responsibilities" and prepare a "Competency Profile" for each of these professions. Letter of appreciation sent to Mr. Michael Vidrine on March 15, 1995.

RECRUITMENT VIDEO: March 15, 1995

Terry Sawma consulted with Mr. Mike Jones and his staff requesting their assistance in developing a recruitment video and preparing the "trailer" portion of the Bell Helicopter -Textron video. Draft to be prepared by early next week.

RECRUITMENT VIDEO: CONTENT OUTLINE March 16, 1995

Michael Jones presented the content outline for both audio and video for comment/approval. Copy was sent to Dr. Rogers for his review/approval.

MAST SUMMER WORKSHOP PROPOSAL March 16, 1995

Terry Sawma prepared a proposal for the MAST Summer Workshops and sent copy to Dr. Rogers and Dr. Botsford. The proposal includes a draft Summer Workshop Application form.

STUDENT LETTERS March 16, 1995

Letters were mailed to thirteen students who have expressed an interest in the pilot program in Machining. The letters include individual applications for the program. Individual names are on file in the MAST office.

HEART OF TEXAS TECH-PREP MEETING, TSTC March 22, 1995

Dr. Rogers, Terry Sawma, and Wallace Pelton presented an overview of the MAST program to High School Counselors, High School Teachers and other participants of the Tech-Prep meeting. Members were presented with TSTC folders containing a description of the MAST program, Student Applications for the Fall 1995 Machinist "pilot" test program, and Student Interest Survey Forms.

REED TOOL COMPANY March 30, 1995

Dr. Rogers, Mr. Pelton, and Mr. Sawma met with Mr. Erv Strahan, Director of Human Resources, and Mr. Wayne Mausbach, Plant Manager, of Reed Tool Company, Inc., Houston, Texas to discuss the developing a Competency Profile for each of the occupational specialty areas of machining, manufacturing Engineering, Tool and Die Making, and Mold Making for Reed Tool Company. Arrangements were made for MAST representatives to visit with appropriate practitioners in each of the occupational specialities at Reed Tool Company during April 1995. Discussion continued on the potential to secure industry sponsored scholarships for the Machinist Certificate option at TSTC. Discussion will continue at the April meeting.

MERCURY TOOL & MACHINE, INC. March 31, 1995

Dr. Rogers, Mr. Sawma, and Mr. Pelton met with Mr. Jack Peck, Vice President of Mercury Tool and Machine, Inc., Waco, Texas and presented a Competency Profile (draft) for Machinist. Mr. Peck will distribute the profile to appropriate personnel at the company for review, comment, and return to the MAST office at TSTC.

Dr. Rogers, Terry Sawma, and Wallace Pelton met to review a draft of the Competency Profile for "Machinist".

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COMPETENCY PROFILES

The following list represents the Competency Profiles prepared through the MAST Program and are either complete or in various phases of validation by our Industrial Partners. Competency Profiles that are complete are identified by the date of completion, those without a date are "in-process".

Title of Program	Contact Source	Date Completed
Machinist:	Mercury Tool and Die	3 March 1995
	Bell Textron	10 February 1995
	ALCOA	15 March 1995
	TSTC/Pelton	27 March 1995
Instrumentation:	TSTC/ Gillum and Poux	15 March 1995
	ALCOA (combined Electrician/INT)	15 March 1995
M.E.T:	TSTC/ Pelton	27 March 1995
	Bell Textron	10 February 1995
Mold Making:	El Paso Community College	in process
	American Mold Builders Association	in process
Electrician:	ALCOA (Electrician/INT)	15 March 1995
	TSTC/ Stuckly	in process
Laser Cutting:	TSTC/Pierson/Harris	to be received April 1, 1995
	Springfield Technical C.C.	in process
Computer Networking:	TSTC/ Zimmerman, Poux, Pelton	in process
Sheetmetal/Aerospace:	TSTC/Reynolds	in process
CIM:	TSTC/ Poux	1 March 1995
IMM:	TSTC/Mills	16 March 1995
	ALCOA	16 March 1995

Title of Program	Contact Source	Date Completed

CAD:	TSTC/Harper	in process
Welding:	TSTC/White ALCOA* (* included in the General Mechanic Profile)	in process
Superabrasives:	TSTC	in process
General Mechanic:	ALCOA	16 March 1995
CNC	TSTC/Pelton Martin Marietta	in process

OTHER SUPPORTING DOCUMENTS (Completed and on file in the MAST Office)

MAST Project Overview	16 February 1995

This overview was prepared for use in presenting the MAST programs goals, objectives, partnerships, problems confronting industry, and issues to be addressed.

Performance Element A Manufacturing Engineering Technology	13 February 1995
Technical Workplace Competencies: Machinist	13 February 1995
Technical Workplace Competencies: M.E.T.	13 February 1995
SCANS/Course Crosswalk	10 February 1995
SCANS Foundation Skills Exit Level of Proficiency Matrix	09 February 1995
SCANS Workplace Competencies Exit Level of Proficiency Matrix	09 February 1995
Technical Workplace Competencies/Course Crosswalk	14 February 1995

OTHER SUPPORTING DOCUMENTS (On file in the MAST Office, continued)

Technical Workplace Competencies: Machinist Exit Level of Proficiency Matrix	14 February 1995
Technical Workplace Competencies: M.E.T. Exit Level of Proficiency Matrix	14 February 1995
M.E.T 100 Course Syllabus	21 March 1995
M.E.T 200 Course Syllabus	21 March 1995

AMTEC/AUGUSTA TECHNICAL INSTITUTE:

I. Consultation with staff on MAST scope of work.

  A. Continue to conduct overviews of MAST project with staff.

II. Preliminary task assignments.

  A. List of AMTEC/Augusta Technical Institute personnel involved with MAST project at this date.

Site Administrator	Dr. Jim Weaver
MAST Project Manager	Ronnie Lambert
Administrative Assistant	Gwen Ford
Administrative Assistant	Marsha Harrison
Programs Specialist	Bob Johnson

III. Contacts and consultations.

  A. Work sessions conducted with Jim Weaver and Ronnie Lambert.

  B. Set up office space, computer, and office equipment.

  C. Contacted Quick Start personnel for input from an industrial viewpoint.

  D. Made contact with faculty personnel.

  E. Made contact with public relations personnel.

F. Made contacts with industry personnel.

G. Made contacts with assessment personnel at Piedmont Technical College.

H. Continue to gather DACUM materials from various sources.

I. Continue to collect industrial assessment materials from industry and post-secondary education.

J. Gathering curriculum materials and skill standards relating to CADD and CNC areas.

K. Contacted Special Schools personnel for input from an industrial viewpoint.

L. Secured Voc Tech catalog of performance objectives, performance conditions, and performance guides for machine tool operations.

M. Secured SC Voc Tech catalog of performance objectives, performance conditions, and performance guides for machine tool operations. A member of our AMTEC/Augusta Tech MAST steering committee was one of the authors of this document.

N. Secured a National Occupational Still Standards in CADD from FIM.

O. Attended National MAST Conference in Oak Ridge, Tennessee.

P. Asked for Sloan Foundation grant as a vehicle for distributing developed MAST project materials.

Q. Hosted AMTEC/Augusta Technical Institute MAST Program Steering Committee meeting.

R. Issued press release on MAST project in local newspaper.

S. Secured State of Georgia Program Guide and Program Standard for the Advance Machine Tool Technology.

T. Contact or meet with industrial representatives daily.

U. Using Texas State Technical College guide for skill assessment.

V. Joined Columbia County Vocational Advisory Committee.

W. Attended Tech Prep Workshop.

X. Secured School-To-Work materials.

Y. Secured competencies list for machine tool operations in Columbia County.

Z. Investigating School-To-Work and Tech Prep as vehicles for MAST proliferation.

AA. Integrating standard questions for interview into the industrial assessment process.

AB. Secured cooperation of Aiken Tec.

AC. Secured cooperation of Piedmont Tec.

AD. Preliminary assessments conducted for three industrial plants.

AE. Contact with Vice President for Business and Industry concerning MAST Project.

AF. Secured CIM Consortium materials for integration into MAST project.

IV. Planning activities - next 90 days.

A. Continue industrial visits.

B. Continue public and post-secondary school visits.

C. Continue activities with steering committee.

D. Conduct DACUMs.

E. Start development of student assessment for pilot program.

F. Start development of course materials.

G. Continue liaison with Technical and Community Colleges in other states.

H. Continue and enhance relationships with training related agencies.

I. Enhance industrial contacts concerning the MAST project.

K. Plan pilot program.

L. Continue developing skill standards and distribute to industry for final critique.

M. Use questionnaire and DACUM as assessment instruments.

N. Continue industrial assessments.

O. Compare skill standards with skills and competencies being taught.

P. Confirm standards and compile information in each occupational area.

Q. Conduct review of technical skills and competencies presently taught.

R. Determine trends and applications that are significant for training.

V. Activities Conducted Last Month.

A. Visited or contacted sixteen industrial plants.

B. Contacted or visited seven high schools.

C. Continued to work with tech prep personnel at PTC.

D. Gathered curriculum materials and skills standards relating to CADD and CNC areas.

E. Joined Columbia County Vocational Advisory Committee.

F. Attended Tech Prep Workshop.

G. Continued to build reference materials.

H. Shared Information Tools for Industry publication from STC with industrial partners.

I. Continued liaison with Quick Start.

J. Continued working with Special Schools.

K. Continued to work with assessment personnel at PTC.

L. Continued to work with school-to-work personnel at PTC.

M. Secured State of Georgia Program Guide and Program Standard for the Advanced Machine Tool Technology.

N. Secured competencies list for machine tool operations in Columbia County.

O. Secured a National Occupational Skill Standards in CADD from FIM.

P. Continued review of technical skills and competencies presently taught.

Q. Conducted preliminary assessments for three industrial plants.

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MORAINE VALLEY COMMUNITY COLLEGE

I. Major Meetings:

January 5	Used agenda at Industrial Faculty In-service to discuss curriculum projects and determine target areas.
February 8-11	Used planned Workforce 2000 conference trip as opportunity to visit MAST partner college San Diego and review project status and approach in plant floor curricula.
February	Held series of meetings with MAST faculty on approach strategies and coordination.
February 17-18	Attended MAST planning session in Knoxville, Tennessee and Oak Ridge, Tennessee.
February 24	Project Directors attended DACUM Workshop.
March	Working DACUM documents created by Publications Department for Job Duties and Task listing. Format set for later addition of textual material on front and back covers. Meetings have been held and future ones are planned with each industrial area. Discussions have been held with Panduit Corporation, Andrew Corporation and Donson Machining concerning their involvement with on-the-job verification of tasks. The regional area high school/college planning consortium, the Moraine Area Career System, has been approached for a revisit of articulation documents in target curricular areas.

II. Current Project Targets:

Initial work centered on:

Curriculum	Specialist
Welding	James Greer
Machinist	Robert Malis
Design Drafting/CAD	Charles Bales

Second level targets:

Computer-Integrated-Manufacturing

Industrial Maintenance Mechanic

Current Time-Lines:

	DACUM Completion	Initial Verification	Initial Publication	On-Site Verification Completion	Final Publication
Welding	5/1/95	6/15/95	6/15/95	8/30/95	9/30/95
Machinist	5/1/95	6/15/95	6/15/95	8/30/95	9/30/95
CAD	5/1/95	6/15/95	6/15/95	8/30/95	9/30/95
CIM	Dates to be set.				
IMM	Dates to be set.				

SAN DIEGO CITY COLLEGE

The Center for Applied Competitive Technologies (CACT)-SD is progressing rapidly on MAST grant activities and is meeting the following milestones:

I. MAST Pilot Programs - Fall '95

In order to pilot the MAST programs at San Diego City College (SDCC) in the Fall of '95, the program design and course outline revisions must be approved by the SDCC Curriculum Committee prior to implementation. The committee meetings are scheduled for May and October 1995. MAST project team has been preparing to submit the revised program and course outlines to the committee at the May meeting.

The Project Coordinator and MAST Core Team of Subject Matter Experts have completed the revisions to the curricula for both the **Advanced CNC and CAD/CAM Technology** and the **Automated Industrial Equipment/CIM Technology** MAST programs. Both of these programs will be presented to the San Diego City College Curriculum Committee on May 1, 1995 for review and approval.

A series of meetings has been scheduled with the Chair of the Engineering and Industrial Technology Department during the first week of April to review the curriculum, as revised, and finalize completion of all the documentation necessary to ensure compliance with any and all College, District and State requirements. The CACT-SD expects the revised curricula to be approved on May 1st, and is prepared to advertise and implement the field test/pilot programs in the Fall of '95.

II. Skills standards Verification

The Subject Matter Experts will complete the identification of skills and tasks for the **Advanced CNC and CAD/CAM Technology** and the **Automated Industrial Equipment/CIM Technology** programs by mid-April. These skills and tasks will be presented to focus groups comprised of industry representatives from small, mid-sized and large companies for each program area, and used to conduct the skills standards validation.

On March 24, 1995, the CACT hired an Independent Contractor to work with the MAST Project Coordinator to design and implement the skills standards validation process. The validation process includes conducting focus group meetings and compiling results to generate skill standards by company and program area. Focus group meetings will be conducted during April and May with the following desired outcomes:

a. Verification of skills identified by Subject Matter Experts;

b. Identification of additional duties and sub-tasks;

c. Establish competency standards;

d. Provide information on industry conditions, limitations and resources.

The CACT-SD will compile the information generated and validated by these focus groups to produce skill standards for each program by company and industry.

III. Contacts with Public School Partners

On March 20, 1995, the CACT-SD hosted the first of a series of meetings designed to introduce the MAST **Advanced CNC and CAD/CAM Technology** program to the Tech Prep program participants. The Tech Prep program is designed to develop smooth articulation from secondary to post-secondary schools. Representatives from all local programs in machining and machine technology at the secondary level attended the meeting and toured the CACT-SD Laboratories.

The topics discussed at the meeting included: sharing of information on Work-force needs within the local machine tool industry, career path options, overview of MAST program content and prerequisite skill levels. The school reps shared information on enrollments, popular specialty areas and areas of interest, and follow up on program graduates.

Articulation agreements were discussed, and it was agreed that they will need to be updated as a result of revisions to the MAST grant curricula. The agreements will be updated with each school individually, once the MAST program course outlines are approved by the curriculum committee in May. The CACT-SD will provide detailed MAST Program course outlines with prerequisite specifications together with skill standards for review and validation by the high school, Regional Occupational Programs and Adult Education Center representatives at the next Tech Prep meeting.

The MAST Project Coordinator is planning another Tech Prep meeting with representatives from all local secondary programs in the manufacturing technology area to introduce the MAST **Automated Industrial Equipment/CIM Technology** program and discuss career path options and program prerequisite requirements. Articulation agreements will be developed with relevant secondary schools currently operating industrial technology programs. This meeting will be scheduled for the end of April.

The CACT-SD also met with representatives from San Diego State University (SDSU) and California State University at Los Angeles (Cal State LA) to discuss and begin developing articulation agreements to allow transfer of selected Machine and Manufacturing Technology courses taken at San Diego City College to these California State University campuses.

IV. NSF Grant Award Received in Support of MAST Program Pilot

The CACT-SD has been awarded an Instrumentation and Laboratory Improvement (ILI) grant by the National Science Foundation's Division of Undergraduate Education (DUE) to acquire selected machine tool components needed to upgrade the CAD/CAM lab for the CACT-SD's MAST Pilot program. Funds received from the grant will be used to purchase a 4th and 5th axes for the vertical Machining Center enabling students to both design and machine advanced CNC surface model programs requiring 4th and 5th axes movement for their production. These higher level CAD/CAM designs are required by industry for sophisticated biomed, biotech and electronics applications.

V. Planned Activities

The following activities are planned for both the **Advanced CNC and CAD/Cam Technology** and **Automated Industrial Equipment/CIM Technology** programs from April 1, 1995 through June 30, 1995:

1. Conduct skill standards validation/verification by the industry focus groups.

2. Compile results and generate skill standards reports for each participating company and for each program area.

3. Begin development of materials and detailed syllabi to support the validated skills standards and approved course outlines.

SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

Summary: The project is progressing according to schedule. We are anticipating total disbursement of first years funds by 9-30-95.

I. Industrial Assessment:

- A survey was developed and distributed nation wide to 53 companies in the laser machining/processing industry. The survey included questions related to general company background, customer base, required skills standards, and willingness to participate in the pilot program. Also, each company was asked to provide feedback on the proposed ten (10) course curriculum and suggest equipment necessary to implement such a program. Of the 53 surveys solicited, we received 13 responses (25% returned). The results have been tabulated and are attached.

- Twelve New England based laser machining companies have been visited to date. Others may be visited as time progresses. In the course of our visits, we discovered that another application of lasers in manufacturing is currently being aggressively pursued, namely rapid prototyping. The two processes being used predominately are stereo lithography and powdered metal sintering. These methods are being used for just-in-time manufacturing as companies continue to shorten their time-to-market process. Also, these processes benefit companies involved in casting procurement by reducing or eliminating the cost of hard tooling. We are currently considering adding these applications to our industrial laser applications course.

- Company literature and information is being compiled and is continuing to be a source of understanding the exact nature of the laser machining industry and their training needs.

- After performing the industrial assessment, we have determined that one of the initial corporate partners, American Saw Mfg. Co., would be inappropriate due to the minimal use of laser technology when compared with the four other partners. Therefore, they have been eliminated as an industry partner.

II. Curriculum development:

- Sources of funding for laboratory equipment are continuing to be pursued through industry partnership and/or equipment consignment programs.

- Other existing short courses and seminars in laser machining and materials processing nation wide are continuing to be examined for content and comparison. To date we have only discovered one training seminar in laser machining, which is offered periodically by the University of Wisconsin at

Madison. This program, however, is a three day seminar taught by industry professionals and **not** a college credit or certificate program.

- DACUM materials are currently being reviewed to maintain standardization in the curriculum development process.
- Technical consultants have been contracted to develop syllabi and course materials for the program. A kick-off meeting was held with the consultants to discuss the overall grant objectives and their individual roles in the program.
- The pilot program teaching schedule was finalized and has been attached.

The following activities are being planned for the third quarter:

- Continuation of visits to New England based laser machining companies for assessment.
- Develop 2+2 articulation programs with area high school partners. The possibility of high school student participation in the pilot program will be pursued. Also, the possibility of expanding the school-to-work program to include the matriculation to the four year level has been discussed in detail with the University of Connecticut and other four year institutions with the ultimate goal of a 2+2+2 program in Engineering.
- Course Design & Development: Create course syllabi including suggested text and appropriate materials using the DACUM process.
- Develop incoming student assessment procedure for potential candidates of the pilot program.

Machine Tool Advanced Skills Technology Program (MAST)

3801 Campus Dr. Waco, Texas 76705
817/867-4849 FAX: 817/867-3380
http://machinetool.tstc.edu/

QUARTERLY REPORT:
BY MORAINE VALLEY COMMUNITY COLLEGE
MAST PROGRAM SUMMARY OF ACTIVITIES AND EVENTS:
JANUARY 1, 1995 - MARCH 31, 1995

Major Meetings:

January 5
Used agenda at Industrial Faculty In service to discuss curriculum projects and determine target areas.

February 8-11
Used planned Workforce 2000 conference trip as opportunity to visit MAST partner college San Diego and review project status and approach in plant floor curricula.

February
Held series of meetings with MAST faculty on approach strategies and coordination.

February 17-18
Attended MAST planning session in Knoxville, TN and Oakridge, TN.

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March
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The regional area high school/college planning consortium, the Moraine Area Career System, has been approached for a revisit of articulation documents in target curricular areas.

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Machinist	Robert Malis
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Industrial Maintenance Mechanic

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CIM	Dates.	To.	Be.	Set.	. . . . . .
IMM	Dates.	To.	Be.	Set	. . . . . .

Machine Tool Advanced Skills
Technology Program (MAST)
3801 Campus Dr. Waco, Texas 76705
817/867-3526 FAX: 817/867-3221

Texas State
Technical College
Waco

MAST QUARTERLY REPORT
PROGRAM SUMMARY OF ACTIVITIES AND EVENTS APRIL, MAY, AND PROJECTED ACTIVITIES FOR JUNE 1995

To: Dr. Hugh K. Rogers
Dean of Instruction
Director: MAST Program

From: Wallace Pelton
Site Coordinator: MAST

Subject: MAST Quarterly Report: April , May, and Projected Activities for June 1995

Date: May 30, 1995

This MAST Quarterly Report includes the activities and events conducted by the MAST Office for April and May 1995 and the Projected Activities for June 1995. All activities are listed in chronological order.

ACTIVITIES/EVENTS: APRIL 1995

BELL HELICOPTER TEXTRON VISIT: APRIL 5, 1995

Ms. Gretta Hecker, Video Production Assistant and crew, IDEAS Center, TSTC, visited Bell Helicopter Textron to film the video portion of VHS tape being prepared by the IDEAS Center.

M.E.T. VIDEO **APRIL 6, 1995**

Ms. Greta Hecker, Video Production Assistant and crew, IDEAS Center, TSTC shot video at Bell Helicopter Textron to be included in the M.E.T. video being produced through the IDEAS Center. Mr. Gray, MET Department Chair, was interviewed on film and video of the machine shop floor was also taken. Final production of the video is expected by the end of the month.

MIDWAY HIGH SCHOOL VISIT: **APRIL 6, 1995**

Dr. Hugh Rogers, Terry Sawma and Wallace Pelton were invited by Letha Hopkins, Assistant Principal of Midway High School to present an overview of the MAST Program to interested students. Opportunities for scholarship funding under the MAST Grant were outlined and Scholarship Applications were distributed to potential students. Approximately 40 students participated. Attendees names, addresses, and phone numbers were recorded for future follow-up. Appreciation letters were sent to Ms. Hopkins, Assistant Principal, and Mr. Don Taylor, Principal, Midway High School.

LETTERS: TECH-PREP **APRIL 7, 1995**

The Tech-Prep Professional Development Consortium and the Heart of Texas Tech-Prep Consortium Meeting was held on March 22, 1995 at TSTC, Waco. Dr. Rogers, Terry Sawma, and Wallace Pelton presented a brief overview of the MAST program objectives to the Secondary School attendees. Mast Program information letters, Student Interest Forms, and Student Scholarship Applications were mailed to twenty-four secondary high school participants on April 7, 1995. Copies of these letters are maintained in the MAST Office.

WACO HIGH SCHOOL VISIT: **APRIL 7, 1995**

Terry Sawma and Wallace Pelton were invited by Mr. Rick Caywood, Counselor, Waco High School, to make a presentation to interested students about the MAST Grant scholarship provisions and the Machinist Certificate Option under the Manufacturing Engineering Technology Curriculum. Approximately 24 students attended. Attendees names, addresses, and phone numbers were recorded for future follow-up. Opportunities for scholarship funding under the MAST Grant were outlined and Scholarship Applications were distributed to potential students. An appreciation letter was sent to Mr. Rick Caywood on April 26, 1995.

MAST/M.E.T. MEETING: **APRIL 7, 1995**

Wallace Pelton made a presentation to the Manufacturing Engineering Technology Faculty meeting. Wallace identified recent activities of the MAST Office Project, described the scholarship program, and answered questions from concerned faculty.

LETTERS: PROSPECTIVE STUDENTS:

APRIL 10, 1995

MAST Program Information letters and Scholarship Applications were mailed, by request, to seven students interested in applying for MAST scholarships in the Machinist program. Copy is on file in the MAST Office.

CACT: SAN DIEGO CITY COLLEGE

APRIL 10, 1995

Received copy of the Skill Standards for Automated Industrial Equipment/CIM Technician Program prepared by the Center for Applied Competitive Technologies (CACT). CACT expects to have the entire set of standards completed and ready for industry validation by April 17, 1995.

SCHOLARSHIP APPLICANT

APRIL 10, 1995

Wallace Pelton visited the Brown family in Lacy Lakeview to describe the MAST Scholarship program to Ralph Kruppa.

DEAN CARLISS HYDE: GENERAL STUDIES DIVISION

APRIL 10, 1995

Terry Sawma met with Dean Hyde to request SCANS Activities be identified for the academic courses required in the Machinist Certificate Option (MTH 115, PSY 112, ORI 102, and ENG 107). Dean Hyde supplied copies of each of the current course syllabi and a list of SCANS skills addressed in each of the academic courses. Dean Hyde will ask each of the faculty responsible for instruction in these courses to identify the specific SCANS activities and forward this information to Mr. Sawma for inclusion in the Course Syllabi under the MAST Grant, subject to approval by Dean Hyde.

SCHOLARSHIP APPLICATIONS RECEIVED:

APRIL 10, 1995

The MAST Office has received its first completed Scholarship Application for the Machining program. Scholarship files have been designated. A MAST Scholarship Application Review Committee will be established to identify policy guidelines for awarding scholarships to applicants. This committee shall review applications, interview candidates, rank candidates, and select all scholarship recipients by no later than June 1, 1995. Approved established policy along with criteria for scholarship awards shall be written and a copy faxed to all of the Design and Development Centers to standardize the process.

ITAWAMBA COMMUNITY COLLEGE **APRIL 10, 1995**

Don Benjamin, Associate Dean of Career Education/Project Administration Officer of Itawamba Community College, Tupelo, Mississippi called to request copy of the full MAST Grant Proposal and ask for assistance in preparing request for reimbursement through the MAST Grant. Since Dr. Rogers was out of town, I suggested he return the call at a later date

COURSE SYLLABI: **APRIL 11, 1995**

Complete course syllabi for MET 100, 200, 300, 400, 1103, 1603, 301, 2303, 2406 and WLT 105 are being written by Wallace Pelton. Industry driven competencies will be used when developing all course syllabi. All syllabi for any given quarter semester will be fully developed three months before the start of any given quarter. This time-frame will permit faculty members to design lecture and laboratory outlines in preparation for the pilot-testing of national curriculum standards. Terry Sawma has completed the course syllabi for ENG 107, PSY 112, MTH 105, AND ORI 102, with the exception of SCANS Activities. SCANS Activities will be provided by faculty members in the respective disciplines. After the integration of SCANS Activities into these courses and crosswalk preparation, all syllabi will be submitted to Dean Hyde for approval and ultimate inclusion in the MAST Program document.

HCC/UNIVERSITY OF HOUSTON FACULTY TOUR **APRIL 12, 1995**

Dr. John Hansen, U of H College of Technology, Mr. J. C. Neill, U of H College of Technology, Mr. Dick Triche, Houston Community College, and Dr. Jimmy Vu, Houston Community College visited TSTC and toured the facilities of MET, CNS, DDT, LET, and ELT.

EL PASO TRIP **APRIL 17-18, 1995**

Terry Sawma and Wallace Pelton flew out of Austin Airport to El Paso, Texas to meet with Dr. Terry Squier, Director of Advanced Technology Center, El Paso Community College. Dr. Squier provided a tour of the college's technology center facilities. Terry and Wallace visited with mold makers at Eureka, Foster Mold, Inc., D.J. Plastics, and El Paso Plastics to identify specific competencies for mold making. See "El Paso Community College and Industry Site Visit" (full) report dated April 19, 1995 memorandum to Dr. Hugh K. Rogers.

LETTERS OF APPRECIATION **APRIL 19, 1995**

Letters of appreciation were written and mailed to all industry practitioners interviewed and appropriate El Paso Community College faculty and staff.

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COMPETENCY PROFILE: MOLD MAKING

APRIL 20-21, 1995

Wallace Pelton prepared the draft copy of the Competency Profile and list of subtasks for Mold Making.

ALCOA COMPETENCY PROFILES: REVISED

APRIL 21, 1995

Wallace Pelton revised the draft Competency Profiles reviewed by ALCOA and returned by Mike Vidrine for Machinist, Maintenance Mechanic, and Electrician. Final copy of the revised Competency Profiles will be sent to Mr. Vidrine with cover letter.

VISIT: MR. JOEY LLOYD, OAK RIDGE LABS

APRIL 24-26, 1995

Mr Joey Lloyd, Machining Training Supervisor, Oak Ridge Labs, Knoxville, Tennessee arrived in Waco and was picked up at the airport by Wallace Pelton. He was provided a tour of the TSTC facilities in MET and IMM. The MAST program initiatives were discussed at length and he was given copy of MAST Presentation Folder. Mr. Lloyd was taken to his Hotel and was expected to go to Bell Helicopter Textron in Arlington, Texas with Dr. Rogers. Mr. Lloyd reviewed the Competency Profiles and Workplace Technical Competencies for CNC and Mold Making. He will be sending information on Sheetmetal and Tool and Die for our review. During his visit he was provided with a tour of Mercury Tool, Inc. Wallace drove him to the airport on April 26, 1995 for his return flight to Oakridge, TN.

TEXAS HIGHER EDUCATION COORDINATING BOARD

APRIL 24, 1995

Terry Sawma made a visit to the Texas Higher Education Coordinating Board to obtain a copy of the Biotechnology Program Proposal (New and Revised) and "Texas Trends in Biotechnology prepared by CORD (Center for Occupational Research and Development)" at the request of Dr. Rogers.

MAST PRESENTATION FOLDERS

APRIL 24, 1995

MAST personnel prepared " MAST Presentation Folders" that contain copy of all completed Competency Profiles and General Information about the MAST program for visitors.

MET VIDEO

APRIL 25, 1995

The MET MAST Video has been completed by the IDEAS Center and will be available for review by the end of the week. Bell Helicopter Textron provided some footage and testimonials on Beta Cam.

TSTC MET/MACHINIST COMPETENCY PROFILES REVISED APRIL 26, 1995

Rose Mary Timmons completed the TSTC Competency Profiles for Machinist and Manufacturing Engineering Technology programs.

COMPETENCY PROFILE: MOLD MAKING APRIL 26, 1995

The Mold Making Competency Profile and subtask listing is completed and in its first draft form. Copies for review and comment have been sent to all the industry contact persons visited during the El Paso trip and to Dr. Squier and Mr. Larry Hartman of El Paso Community College.

IN PROCESS: COMPETENCY PROFILES APRIL 26, 1995

The MAST office is awaiting information form LASER Machining, Welding, Computer Networking and Instrumentation to complete the competency profiles and outlines for these speciality areas. The respective Department Chairs have indicated the requested information will be available by the end of April. Tom Reynolds has prepared some information on technical competencies for Sheetmetal and we are awaiting additional information from Oakridge, Tennessee via Joey Lloyd.

INVITATION: KILLEEN ISD APRIL 26, 1995

The mast office received an invitation from Mr. Edward Lindsey, vocational counselor, Killeen ISD to visit the Killeen Campus and present information about the MAST program to interested students. Wallace will make arrangements through Mr. Lindsey to visit their campus along with Terry Sawma before May 12, 1995.

CNC COMPETENCY PROFILE COMPLETED APRIL 26, 1995

The first draft of Competency Profiles and Technical Workplace Competencies for CNC are complete and ready for industry validation.

MOLD MAKING COMPETENCY PROFILES APRIL 28, 1995

The first draft of the mold making Competency Profile and Technical Workplace Competencies were mailed, as promised, to Dr. Squier, El Paso Community College and to the industry practitioners interviewed during the recent El Paso trip for comment and validation.

SCHOLARSHIP APPLICATIONS RECEIVED: APRIL 30, 1995

A total of four completed MAST Scholarship Applications have been received in the MAST office for the Machining Option for Fall 1995. A Scholarship Review Committee will be convened during May 1995 and will be composed of Dr. Botsford, Terry Sawma, Wallace Pelton and George Gray This committee will review all applications and determine scholarship recipients.

ACTIVITIES/EVENTS: MAY 1995

ACADEMIC COURSE SYLLABI: May 1, 1995

Terry Sawma met with Ms. Margaret Kimball (Math), Mr. Michael Pierce (English), Ms. Sylvia Edwards-Borens (Psychology and Orientation), and Ms. Cecile Hollyfield (Integrated Digital Imaging), to identify specific SCANS activities for their respective courses required in the Machinist Certificate option. Once the specific SCANS activities are identified, the SCANS/Course Crosswalks will be updated and the syllabi for MTH 115, PSY 112, ENG 107, and ORI 102 will be updated to include SCANS activities. The Crosswalks and course syllabi will be reviewed by each of the academic faculty and by Dr. Carliss Hyde.

CENTER FOR APPLIED COMPETITIVE TECHNOLOGIES May 1, 1995

Wallace Pelton talked with Ms. Mary Bernard, San Diego City College MAST Site Coordinator, and outlined the industry interview process being conducted at TSTC. San Diego City College is preparing for industry validation of developed competency profiles of CNC Controls and Shop Floor Control Systems Applications, Computer Networking, and Advanced CNC Technology.

M.E.T. ADVISORY COMMITTEE MEETING May 3, 1995

Wallace Pelton presented an overview of the MAST objectives to members of the MET Advisory Committee. A motion was made to endorse the activities of the MAST program. MAST program officials were invited to Bowen Tool and Smith International, Houston, Texas.

CENTER FOR APPLIED COMPETITIVE TECHNOLOGIES May 3, 1995

Wallace Pelton spoke with Mr. Louis Spain, Consultant with San Diego City College, who is responsible for meeting with industrial partners to validate competency profiles. Mr. Spain asked questions about the industry interview protocol conducted at TSTC.

IVY TECH STATE COLLEGE **May 3, 1995**

Mr. Rod Alsman, Ivy Tech, called to speak with Wallace Pelton about the competencies for Superabrasives (Grinding) and the applications of the Machinist Handbook for this curriculum. The MAST office received syllabi from Indiana Vocational Technical College for Machinery Handbook (MTT 104), Abrasive Processes I (MTT 204), Abrasives Processes II (MTT 205), Aviation Technology 103, Aviation Technology 210, and Aircraft Maintenance Technology Course Descriptions .

INTEGRATED DIGITAL IMAGING **May 4, 1995**

Ms. Cecile Hollyfield and Terry Sawma met to discuss integrating SCANS Skills into the IDI curriculum. Ms. Hollyfield provided copies of available IDI course syllabi.

MAST VIDEO **May 5, 1995**

Ms. Jill Bachman, IDEAS Center, Dr. Hugh Rogers, and Terry Sawma reviewed the MAST video prepared by the IDEAS Center and identified sections of the video for editing. Dr. Rogers requested the revisions to the video be completed before the Tulsa MAST National Meeting. Ms. Bachman indicated that the editing could be completed before the May 21, 1995 date.

MAST PARTNERS LETTER **May 5, 1995**

Copies of MAST Monthly Reports were mailed to all MAST Design and Development Centers along with a cover letter requesting listing of Industrial Partners in preparation for the national survey.

MAST SURVEY **May 5, 1995**

Terry Sawma and Wallace Pelton met with Dr. Darlene Morris, Director of Institutional Research and Planning, to request assistance in developing the National Industry Survey, appropriate software for preparing the survey, and performing an analysis of the survey. Dr. Morris suggested the MAST project use the software available at the office of Institutional Research and Planning since purchase of the software and scanner would be cost-prohibitive. Dr. Morris and Mr. Fred Nelson suggested survey formats that would be appropriate and indicated that a draft survey could be ready for the National Meeting in Tulsa, Oklahoma.

MAST SURVEY

May 6, 1995

Terry and Wallace prepared the draft survey questions and delivered copy to Mr. Fred Nelson. Mr. Nelson will enter the questions into the software package and prepare a draft survey for May 15, 1995 for our review. The survey should be ready for review by MAST partners at the Tulsa, Oklahoma meeting.

CENTER FOR APPLIED COMPETITIVE TECHNOLOGIES

May 8, 1995

Terry Sawma spoke with Dr. Joan Stepsis, Dean/Director of San Diego City College CACT, about the draft survey to be presented at the Tulsa meeting. Copies of the survey questions were faxed to Dr. Stepsis and Mary Benard for their review and comments.

MAST SCHOLARSHIP APPLICATIONS

May 8, 1995

Mr. Jeff Walker stopped by the office and received an application for the MAST Scholarship in Machining.

LA VEGA HIGH SCHOOL VISIT

May 9, 1995

Wallace Pelton and Terry Sawma visited La Vega High School at the invitation of Ms. Rose, Mr. Walker, and Mr. Elliott to present information about the MAST program and scholarships to interested students. Student applications were given to interested participants at the close of the presentation. Dr. Rogers addressed the group as well.

KILLEEN HIGH SCHOOL

May 10, 1995

Wallace Pelton visited Killeen High School and presented information about the MAST program, including available scholarships for the Machinist certificate option. He met with interested high school students in three separate sessions. Scholarship applications were distributed.

REED TOOL COMPANY, HOUSTON

May 11, 1995

Dr. Rogers, Wallace Pelton and Terry Sawma conducted validation of Competency Profiles at Reed Tool Company, Inc. for Machinist, Tool and Die Maker, Industrial Maintenance Mechanic, Electrical Systems Technician, and CAD/CAM.

ACADEMIC COURSE SYLLABI

May 15, 1995

The MTH 115 course syllabus has been reviewed by Ms. Margaret Kimball. Minor changes have been entered and copy sent to Ms. Kimball and Dr. Hyde for final review.

APPRECIATION LETTERS

May 15, 1995

Appreciation letters were sent to Edward Lindsey, Vocational Counselor, Killeen High School, and Jack A. Wells, Director of Career and Technology Education, Killeen High School. Appreciation letter was sent to E.E. Strahan, Manager-Labor Relations, Reed Tool Company, Houston, Texas. An appreciation letter was also sent to Ms. Carolyn Rose, Counselor, La Vega High School for hosting members of the MAST Program on May 9, 1995.

SCHOLARSHIP APPLICATION UPDATE

May 15, 1995

Five MAST Scholarship Applications have been received to date. Wallace met with Shawn Walker, La Vega High School, and Hal Lynch to describe the available MAST scholarships.

ELECTRICAL SYSTEMS TECHNOLOGY

May 17, 1995

Terry Sawma met with Mr. Elton Stuckly, E.S.T., to review the Competency Profile and the Technical Workplace Competencies. Terry requested that "subtasks" be identified by Mr. Stuckly and the MAST office will prepare an updated "Profile" and Technical Workplace Competencies (Outline) for Electrical Systems Technology. Mr. Stuckly agreed to place one of his faculty members on this task during the Summer I semester.

MAST INTERVIEWS

May 17, 1995

At the request of Dr. Rogers, Wallace Pelton and Terry Sawma participated in employment interviews for the MAST positions for Project Coordinator and MAST Secretary. Several candidates were interviewed for the secretarial position while a single candidate was interviewed for the Project Coordinator position.

SCHOLARSHIP APPLICANT

May 19, 1995

Terry Sawma met with Mr. Ben Strot to describe the MAST Scholarship Program. Mr. Strot completed an application while in the office and was provided a tour of the Machine Shop.

CIM/HE CONFERENCE May 21-24, 1995

Dr. Rogers, Wallace Pelton, and Terry Sawma left for Tulsa, Oklahoma for the CIM/HE 1995 Conference on Sunday, May 21, 1995. A meeting of the MAST Partners was called for Sunday, May 21, 1995 at 2:00 p.m. at the Doubletree Hotel. Dr. Rogers presented an overview of MAST activities to attendees. Terry Sawma and Wallace Pelton distributed copies of the "National Meeting MAST Partners Representative Project Documentation" and summarized the methodology, data collection protocol, Competency Profiles, Technical Workplace Competencies (Outlines), and presented the draft survey. Suggestions were made to improve the survey and will be incorporated into the second draft for further review. The second draft survey will be formatted this week through the office of Institutional Research and Planning.

COMPETENCY PROFILE COMMENTS/VALIDATION May 24, 1995

Competency Profiles were returned from three practitioners of Eureka Vacuum Cleaners, El Paso, Texas for Mold Maker. Final copy will be sent to Eureka during the first week in June, 1995.

COMPETENCY PROFILES COMPLETED May 25, 1995

Reed Tool Competency Profile drafts have been completed for the occupational specialities of CAD/CAM, Industrial Maintenance Mechanic, Tool and Dye Maker, Machinist, and Electrical Systems Technician. Copies were mailed to Reed Tool for validation on May 26, 1995.

MARTIN MARIETTA COMPETENCY PROFILES May 30, 1995

The Martin Marietta Competency Profiles for Electrical Systems Technician, Electrician/Instrumentation, Instrumentation and Control Technician, Computer Integrated Manufacturing Technician, and Industrial Maintenance Mechanic are being prepared by the MAST office. Completed Competency profiles will be mailed during the week of June 10, 1995.

SAN DIEGO CACT COMPETENCY PROFILES May 30, 1995

Competency Profiles and Outlines for Advanced CNC and Automated Industrial Equipment/CIM Technician are being prepared by the MAST office and will be mailed to Ms. Mary Benard, Site Coordinator at San Diego City College, as soon as completed.

NON-METALLICS COMPOSITES PROCESSING:

May 30, 1995

Non-Metallics Composites Processing Duties and Tasks statements were received from Mid-Florida Technical Institute, Orlando, Florida. A Competency Profile is being prepared by the MAST office for Non-Metallics Composites Processing.

LASER MACHINIST:

May 30, 1995

The Technical Workplace Competencies for Laser Machinist were received from Springfield Technical Community College. The MAST office will be formatting this information into a Competency Profile and Outline that identifies the Duties, Tasks, and Subtasks consistent with the MAST model.

SCHOLARSHIPS: MACHINIST

May 30, 1995

A total of twelve scholarship applications for the Manufacturing Engineering Technology Machinist Certificate option have been received by the MAST office. At the request of Dr. Rogers, the MAST office will notify each scholarship recipient. Letters of the award and conditions of the scholarship will be prepared by this office and mailed to all recipients during the month of June.

**Machine Tool Advanced Skills
Technology Program (MAST)**
3801 Campus Dr. Waco, Texas 76705
817/867-3526 FAX: 817/867-3221

ACTIVITIES AND PROJECTED ACTIVITIES: JUNE 1995

MAST SCHOLARSHIP RECIPIENTS NOTIFIED June 1, 1995

All machinist certificate Scholarship recipients have been notified by phone and follow-up notification by mail. The terms of the scholarships, activities, and registration materials were included in the mailings. At this time we plan to have a reception for both the student scholarship recipients and their parents. Details are to be worked out during consultation with Dr. Rogers.

COMPETENCIES PROFILES/ CIM and CNC MACHINIST June 2, 1995

At the request of the CACT Center at San Diego City College, Wallace Pelton prepared Competency Profiles for CNC Machinist and Automated Industrial Equipment/CIM Technician and E-mailed copy to the CACT, faxed copy, and mailed copy by overnight delivery. CACT partners will review, edit as necessary, and use these documents during industry visits.

TECHNICAL WORKPLACE COMPETENCIES: COMPOSITES June 5, 1995

The Technical Workplace Competency (Outline) for Non-Metallics Composites Processing Technician was prepared by Terry Sawma. Subtasks have not been identified.

LETTERS June 5, 1995

At the request of Dr. Rogers, Terry Sawma composed a letter to Carol Harper, Department Chair of Drafting and Design, requesting validation and assistance in identifying Tasks and Sub-tasks for CAD.

At the request of Dr. Rogers, Wallace Pelton sent a letter to Ms. Margaret Ann Hohly, Coordinator of Instructional Computing at Cerritos College, Norwalk, California, requesting Duties, Tasks, and Sub-tasks for Composite Technician

TECHNICAL WORKPLACE COMPETENCY OUTLINES

June 5-8, 1995

Technical Workplace Competency Outlines first drafts were completed for the occupational specialities for Sheet-Metal Mechanic, Laser Technicians, and Computer Networking. They are to be reviewed by faculty and administrators in their respective divisions for modification.

CIM/HE CONFERENCE FOLLOW-UP

June 5, 1995

At the CIM/HE Conference, Dr. Henry W. Kraebber, Jr., Associate Professor, Computer Integrated Manufacturing Technology, Purdue University, indicated an interest in the MAST Project. I have composed a letter to Dr. Kraebber asking him to review the materials, including the Competency Profile and Outline for CIM Technology and the second draft of the survey. This letter will be sent out of Dr. Roger's office. Dr. Kraebber received a copy of the "Representative Project Documentation" at the CIM/HE Conference. A copy of the second book, "Representative Project Documentation" version #2, will be sent to Dr. Kraebber when it is available.

LETTERS

June 5, 1995

Dr. William Brown, Director of Computer Integrated Manufacturing at Trident Technical College, Charleston, S.C., is also interested in the MAST Project and indicated his willingness to review the materials for CIM Technician. Dr. Brown received a copy of the "Representative Project Documentation" at the Tulsa meeting. A copy of the second "book" will be sent to Dr. Brown when it is available. I have composed a letter to Dr. Brown asking him to review the materials, including the Competency Profile and Outline for CIM Technology and the second draft of the survey , at the request of Dr. Rogers and it will be mailed out of Dr. Roger's office

At the request of Dr. Rogers, I composed a letter to Dr. James Weaver, Director, Advanced Manufacturing Technology Center (AMTEC), Augusta Technical Institute asking him to review the materials, including the Competency Profile and Outline for CIM Technology and the second draft of the survey. Dr. Brown will also receive a copy of the "Representative Project Documentation" v 1.0" which was distributed at the Tulsa Conference. A cover letter will describe the MAST methodology and data collection techniques. Request will be made for a list of AMTEC's Industrial Partners to be included in the national survey. These materials will be mailed to dr. Brown out of Dr. Rogers' office.

At the request of Dr. Rogers, a letter will be drafted for his review and sent to Mr. Dick Graham, Director, NIST/Mid-America Manufacturing Technology Center, requesting a list of manufacturers in his area that may be appropriate to receive the national MAST survey.

A letter will be drafted by Dr. Rogers expressing appreciation of the TSTC MAST office for their review of the draft survey and other representative documentation and mailed to all the MAST partners. Request will be made for all industrial partners listings and explain the plan for all survey mailings to be made from the MAST TSTC, Waco office. The Survey is expected to be mailed during mid-July.

MAST STAFF MEETING June 7, 1995

Dr. Rogers, Dr. Botsford, Mr. Sawma, Mr. Pelton, and Mr. Penick met to discuss the strategies for subtask identification in specific occupational specialities.

NATIONAL SURVEY, DRAFT #2 COMPLETED June 7, 1995

The second draft of the national survey is completed and will be included in Project Documentation, version #2 for distribution to all MAST partners and other appropriate persons for review and comment.

COMPETENCY PROFILE/OUTLINE INVENTORY June 8, 1995

The MAST office composed a current Competency Profile/Outline Inventory which identifies completed products of the office by occupational speciality.

PROJECT DOCUMENTATION BOOK 2 June 8, 1995

A second "Representative Project Documentation" v 2.0 is being prepared by the MAST office and will be completed by June 16, 1995. Tentatively, this second draft will include additional materials, including technical and academic course syllabi, revised survey, updated Technical Workplace Competencies and SCANS crosswalks, Machinist Curriculum Outline and course descriptions, and updated Competency Profiles from all MAST Partners .

LOCKHEED MARTIN COMPETENCY PROFILES June 8, 1995

Competency Profiles have been completed for Lockheed Martin in the occupational specialities of Machinist, CNC, CIM, MET, ELT, EST/INT, INT, and IMM. The Competency Profile for Welding is being prepared by Mr. Joe Penick and will be complete by early June for review and validation.

PROJECT METHODOLOGY NARRATIVE REVISED June 9, 1995

Terry Sawma, at the request of Dr. Rogers, revised the Project Methodology Narrative for inclusion into the Project Documentation Book #2.

COMPETENCY PROFILE: WELDING

June 12, 1995

Mr. Joe Penick has completed the first draft of the Welding Competency Profile and Technical Workplace Competencies for review by the Welding Department. Rose Mary Timmons prepared the Competency Profile using PageMaker software.

COMPETENCY PROFILE: SUPERABRASIVES

June 12, 1995

Mr. Joe Penick met with Mr. Rufus Lamere to begin identifying the Duties, Tasks, and Subtasks for Superabrasives Technician.

COURSE SYLLABI COMPLETED

June 12, 1995

Course Syllabi, including SCANS, have been completed for all courses in the Manufacturing Engineering Technology Machine Certificate Option for the first quarter and are to be submitted to the Department Chair, Assistant Dean and Dean of Instruction for approval. Course syllabi include MET 100, MET 1103, MET 1603, PSYC 1100, and MTH 115.

Course Syllabi, including SCANS, have been completed for the academic courses of PSY 112 and ENG 107. The MAST office is preparing course syllabi for all courses in the second quarter for the Machining Certificate option including MET 200, ENG 107, WLT 105, and PSY 112.

MAST OFFICE ORIENTATION: LADEAN PHILLIPS

June 12, 1995

Ms. Rose Mary Timmons briefed the MAST Senior Secretary, Ms. Ladean Phillips, on MAST activities, documentation, hard drive storage, software, etc.

PROJECT DOCUMENTATION BOOK 2 COMPLETED

June 13, 1995

The MAST office completed the second version of the MAST Project Documentation Book for distribution as determined by Dr. Rogers.

PROJECTED ACTIVITIES FOR JUNE 1995

NCATC MEETING, BETHLEHEM, PENNSYLVANIA

Dr. Rogers will be attending the NCATC meeting in Bethlehem, Pennsylvania June 22-24, 1995. He will make formal presentation to NCATC participants on both June 21 and June 22, 1995 identifying the activities of the MAST partners, goals, purpose, and status of deliverables.

NETWORK TO BE ESTABLISHED

A networking system will be set up between all MAST partners and affiliates to facilitate rapid communication and correspondence between the MAST members. The establishment of this network should be complete during June, 1995.

ADDITIONAL INDUSTRY SITE VISITS PLANNED

Industry visits are being planned through the Office of the Project Director to Stewart & Stevenson Services, Inc., Houston, Texas; Chrysler Technologies, Waco, Texas; Aviall, Arlington, Texas; and IBM. Additional industry visits are in the planning stages for computer manufacturers in the Austin area and are being arranged by Dr. Rogers.

SCANS ACTIVITIES: ACADEMIC COURSE SYLLABI

SCANS activities have been identified for the general academic courses required in the Machinist Certificate option and infused into the course syllabi of MTH 115, PSY 112, and PSYC 1100 and are awaiting department and division review and approval. Once the department and division approve all SCANS activities the SCANS/Course Crosswalk will be updated and a sample course syllabus will be included in the "Representative Project Documentation" version #2.

Work is continuing in the following areas to complete Competency Profiles and Technical Workplace Competencies:

Computer Networking
Welding
Instrumentation
Sheetmetal
Composites
Laser Machining

An additional MAST Secretary will obtain a list of all 1995 High School Graduates and prepare a recruiting mail-out describing the MAST scholarship program at TSTC.

The MAST Project Coordinator, Mr. Joseph Penick, was employed beginning June 2, 1995. The addition of a MAST Secretary will compliment the activities of this office. Interviews for the MAST Secretary position continue.

A data base of industries to be surveyed will be prepared for the survey mailings expected in July 1995. We await Industry names, contact person(s) title (s), addresses, and occupational specialities from each of the MAST partners.

Additional activities conducted through the MAST office that are not foreseen at this time will be identified in the June report at the end of June 1995.

Prepared by:

Wallace Pelton

Wallace Pelton
Site Coordinator: MAST Program

Machine Tool Advanced Skills
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QUARTERLY REPORT: BY MORAINE VALLEY COMMUNITY COLLEGE MAST PROGRAM SUMMARY OF ACTIVITIES AND EVENTS:
APRIL 1, 1995 - JUNE 30, 1995

Major Meetings:

April 1 - June 30
Series of meetings held with faculty consultants on each draft phase of task and duty lists.

April 20
Meeting was held with Bimba Manufacturing concerning apprenticeships and the MAST project.

May 25, 1995
Meeting was held concerning the CIM workcell and its improvement to support the changes in the curriculum to support the MAST projects of Machinist, Maintenance Mechanic, and Shop Floor/PLC Controls.

May 22, 1995
Participated in MAST dissemination project at the annual Computer-Integrated-Manufacturing in Higher Education conference in Tulsa, OK.

June 22, 1995
Participated in major MAST dissemination project at the National Coalition of Advanced Technology Centers national meeting in Bethlehem, PA.

June 27, 1995
Meeting was held with McCain Manufacturing to discuss machinist apprenticeship in relation to the MAST project.

Current Project Targets:

Current work centered on:	Curriculum	Specialist
	Welding	James Greer
	Machinist	Robert Malis

Design/Drafting/CAD Charles Bales

Second level targets:

Computer-Integrated-Manufacturing	Robert Malis
Industrial Maintenance Mechanic	Robert Malis
Shop Floor Control/PLC	Alex Johansson

The time frame on the second level targets will be enhanced to assure that they are completed in the first project year.

Current Time Lines:

Occupational Specialties	DACUM Completion	Initial Verification	Final Verification	On-Site Verification Completion	Final Publication
Welding	5/1/95	Done	8/1/95	8/30/95	*9/30/95
Machinist	5/1/95	Done	8/1/95	8/30/95	*9/30/95
DFT/CAD	5/1/95	Done	8/1/95	8/30/95	*9/30/95
CIM	8/1/95	9/1/95	9/15/95	9/30/95	10/15/95
IMM	8/1/95	9/1/95	9/15/95	9/30/95	10/15/95
PLC	8/1/95	9/1/95	9/15/95	9/30/95	10/15/95

*Interim publication of the DACUM grids set for 7/20/95. They go to our Publications Office on Tuesday, 7/11. They will be mailed to TSTC-Waco as soon shortly after 7/20.

Machine Tool Advanced Skills Technology Program (MAST)
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Texas State
Technical College
Waco

QUARTERLY REPORT:
MAST Program Summary of Activities and Events
July 1, 1995 - September 30, 1995

Submitted to:
Dr. Jackie Friederich, Education Research Analyst
Ms. Marie Clear Buker, Education Programs Specialist
United States Department of Education
330 C. Street
S.W. Mary Switzer Building
Room 4522
Washington, D.C. 20202
D.O.E. # V199J40008

The status of the MAST project with respect to the stated goals are as follows:

- **Industrial Assessment:**

  MAST project personnel are completing the final phase of an industry-wide assessment of the machine tool and related technologies to define the technical workplace competencies for each of the occupational specialities. Competency Profiles will be completed by all partner colleges by November 30, 1995 for each of the occupational specialities. Texas State Technical College has prepared draft industry survey forms and a national mailing list that will be presented to the partners at the October meeting for review. Industry survey forms will be mailed to participating industries in Texas for validation/comment during October 1995.

- **Curriculum Development:**

  The curriculum model in Machining Technology is in draft form and will be delivered to MAST partner colleges at a national meeting in Chicago on October 10-11, 1995. This is the draft Book #4 of a 15 volume set (Volume #4 is enclosed). Each partner has been assigned as the lead institution for specific occupational specialities and will prepare their draft curricula by January 31, 1996. The MAST Steering Committee meeting will review these draft curricula during April 1996. The curriculum model includes all course syllabi, technical workplace competencies/course crosswalk, SCANS/course crosswalks, complete outlines with Duties, Tasks and subtasks, and competency profiles.

- **Pilot Program:**

  Twenty five students have been enrolled in the Manufacturing Engineering Technology Machinist's Certificate program at Texas State Technical College during August 7-11, 1995. Each partner college has enrolled students in their pilot programs during the Fall 1995 semester. Evaluation of the curricula content and effectiveness will be conducted at each lead partner college for their assigned speciality.

- **Student Assessment:**

  All Machinist Certificate students will be assessed for entry level skills and competencies (pre-test) during October 1995. The assessment tool is being developed by MAST project personnel. At the completion of the certificate, each student will be given a post-test to evaluate skill competencies.

- **Project Deliverables:**

The Project Deliverables Gantt Chart (time line) is enclosed.

A draft video, describing the goals of the MAST program has been prepared. Partner colleges will be reviewing the video. The final video will include footage from each partner college and their industry partners. It will also include a description and discussion of each of the deliverable products and how to obtain copies.

The MAST Internet Home page is being built and includes information about the MAST project, partner colleges and Design and Development Centers, detailed course syllabi for all occupational specialities, SCANS/Course Crosswalks, expected Exit Level proficiencies, Technical Workplace Competencies/Course crosswalks, and industry surveys.

During the next quarter, MAST personnel will participate in a number of national meetings and symposiums as follows:

- Texas Association of Schools of Engineering Technology (TASET) on September 28-29, 1995 in Houston, Texas.
- NCATC meeting in San Diego, CA. Five separate MAST briefs on November 15-18, 1995.
- AVA meeting in Denver CO. on December 1-5, 1995. MAST presentation and symposium.
- Provided booklet for the National Alliance for Business meeting in Washington, D.C. on October 12-13, 1995.

Joe Penick

Joe Penick
MAST Project Director

Enclosures:

1. Activity of Events: July, August, and September, 1995
2. Deliverables Time line (Gantt Chart)
3. Draft Deliverables Format
4. Volume # 4 of Draft Deliverables
5. Booklet for National Alliance for Business, October 12-13, 1995
6. Agenda Book for October 10-11, 1995 Partners' Meeting, Chicago, IL.
7. TASET Agenda
8. Texas Survey
    - Survey Card
    - Cover Letter
    - Texas Mailing List
9. Manufacturing Engineering Technology Advisory Committee, Reed Tool Company, October 3, 1995

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QUARTERLY REPORT
BY AUGUSTA TECHNICAL INSTITUTE
MAST PROGRAM SUMMARY OF ACTIVITIES AND EVENTS:
JULY 1, 1995 - SEPTEMBER 30, 1995

Contacts and Consultations

- Attended NCATC Conference in Bethlehem, PA.
- Plan to test CNC course with local industries as part of remote site training module development.
- Visited Piedmont Technical College.
- Site selected to test CNC course with a specific industry in local area.
- Received information gained from GA State Youth Apprenticeship Conference in Atlanta recently.
- Working with local industrial plant using Flexible Machining Centers.
- Continue to collect skill validations from industry.
- Visited Aiken Technical College.
- Preparing for fall semester with local high schools and technical colleges.
- Working with local industrial plant in setting up a youth apprenticeship program.
- Visited the following industrial facilities: FMC, Thermal Ceramics, Jarvis Cutting Tools, R.E. Phelon, Thermal King, Brunner, Defiance Products, Greenfield, Automatic Switch Company, Alerich Machining, Club Car, Velux, EZ Go Textron, Richmond Machining, Milliken, Fulghum Industries, Davis Machinery, Greenwood Mills and Kaiser Aluminum.

- Continue to work with Quick Start personnel.
- Produce brochure describing a condensed profile of MAST from a local point of view.
- Continue to work with Special Schools personnel.
- Began distribution of brochure to industry and high schools.
- Compiling occupational competency profiles from industries.
- Continue to work with assessment personnel and Piedmont Technical College.
- Continue to serve on Columbia County Vocational Advisory Committee.
- Continue to collect industrial assessment materials from industry and post-secondary education.
- Continue to collect school to work materials.
- Planning pilot program.
- Planning course outlines.
- Continue to work with school to work personnel at PTC.
- Continue review of technical skills and competencies presently taught.
- Continue to work with Tech Prep personnel at PTC.
- Shared Program Guide and Program Standard with PTC.
- Continue to work with Tech Prep personnel at ATC.
- Shared Program Guide and Program Standard with ATC.
- Use advisory committee for Machinist Program at ATI as SME's for MAST.
- Continue to build reference materials.
- Use advisory committee for Machinist Technology Program at PTC as SME's for MAST.
- Secured comprehensive list of courses for ATC.
- Use advisory committee for Machinist Technology Program at ATC as SME's for MAST.
- Continue to build reference materials.

- Sharing Information Tools for Industry publication from STC with industrial partners.
- Secured comprehensive lists of course offerings for PTC.
- Work with FAMS project in high school and correlate to MAST.
- Using Texas State Technical College guide for skill assessment.
- Produced brochure for PTC and MAST.

Machine Tool Advanced Skills Technology Program (MAST)
3801 Campus Dr. Waco, Texas 76705
817/867-4849 FAX: 817/867-3880

Texas State
Technical College
Waco

QUARTERLY REPORT:

MAST Program Summary of Activities and Events
October 1, 1995 - December 31, 1995

Submitted to:
Dr. Jackie Friederich, Education Research Analyst
Ms. Marie Clear Buker, Education Programs Specialist
United States Department of Education
330 C. Street
S.W. Mary Switzer Building
Room 4522
Washington, D.C. 20202
D.O.E. # V199J40008

The status of the MAST project with respect to the stated goals are as follows:

- **Industrial Assessment:**

  MAST project personnel are completing the final phase of the industry-wide assessment of skills for each of the fifteen occupational specialty areas which are under investigation. Most Competency Profiles have been completed and are ready for final (National survey) validation. The TSTC project staff has completed the Texas survey and is now preparing to mail out survey forms for the National survey. Survey forms will be mailed to participating industries for validation/comment during January-February 1996.

- **Curriculum Development:**

  Work is nearing completion on all documentation for the advanced specialty areas specified in the grant. Many deliverables are now in the final edit process. Emphasis is shifting to other project deliverables (remote site training modules, career orientation modules, etc.) Examples have been prepared for MAST partner colleges to be reviewed at a national meeting in Chicago on January 18-19, 1996. Partners will be instructed as to required formats and due dates for all deliverables. Deliverables must be received at TSTC for final edit/formatting/dissemination during the first quarter of 1996. The MAST Steering Committee meeting will review these draft curricula during April 1996. Final printing and dissemination will commence shortly thereafter.

- **Pilot Program:**

  Of the twenty five students who enrolled in the Manufacturing Engineering Technology Machinist's Certificate program at TSTC, only one failed to return for the Winter quarter. Partner colleges have been awarded three equivalent scholarships (total value $6000.00/each college) for use in their pilot programs to assist with student tuition and books. Evaluation of the curricula content and effectiveness is ongoing at each partner college. Pilot program narratives will be included in deliverables books. This narrative will describe the pilot program recruitment efforts, student population make-up, results of entry and exit level testing, attrition rate, and job placement information.

- **Student Assessment:**

  All MAST students have been assessed for entry level skills and competencies. The assessment tool was provided, in some cases, by Career Orientation and Placement staff personnel on campus. Some partner colleges used tests which were prepared by faculty. At the completion of the course of study, each student will be given a post-test to evaluate skill competencies.

▸ **Project Deliverables:**

A revised Project Deliverables Gantt Chart (time line) is enclosed. There are no time extensions or deletions to the revised edition. The revision represents added detail.

A copy of the Deliverables book which was given to the partners as a reference is included with this report.

The MAST Internet Home page is up and running (http://machinetool.tstc.edu) and includes information about the MAST project, partner colleges and Design and Development Centers, detailed course syllabi for all occupational specialities, SCANS/Course Crosswalks, expected Exit Level proficiencies, Technical Workplace Competencies/Course crosswalks, and industry surveys. As information comes in from each of the partners it is entered onto the system. This process will take some time to complete.

MAST personnel made presentations at a number of national meetings and symposiums during this quarter. MAST materials were prepared for distribution at each meeting, as needed. The meetings were as follows:

- Advisory Committee - La Vega High School, Bellmead, Texas on Oct.17, 1995.
- Manufacturing Engineering Technology (TSTC) faculty meeting - Waco, Texas on Oct. 23, 1995.
- National Coalition of Advanced Technology Centers (NCATC) at San Diego City College, San Diego, California on Nov. 16-17, 1995. MAST had six presentations at this conference.
- American Vocational Association (AVA) meeting in Denver, Colorado on Dec. 3, 1995.
- National Skill Standards Program Directors Meeting in Washington D.C. on Nov. 20-21, 1995.
- National Tooling and Machine Association (NTMA) and National Institute of Metalworking Skills (NIMS) meetings on skills standards in Fort Washington, Maryland on Dec. 11, 1995.

Joe Penick
Joe Penick
MAST Project Director

Enclosures:

1. Deliverables Time line (Gantt Chart)
2. Agenda Book for Partners' Meeting January 19, 1996

MAST Deliverables Scheduled

		Dec 95	Jan 96	Feb 96	Mar 96	Apr 96	May 96	Jun 96	Jul 96	Aug 96
TSTC	1. Collate Texas Survey	■	■							
TSTC	2. Mail National Survey	■	■							
TSTC	3. Collate National Survey		■	■						
ALL	4. Partner Speciality Books, Volumes 3-14			■						
CATC	5. Executive Summary, Volume 1			■						
TSTC	6. Remediation & General Education, Volumes 2 & 15			■						
ALL	7. Remote Site Training Package (1 per site)			■						
ALL	8. Career Enhancement Outline (tours)			■						
ALL	9. Regional MAST Video (1 per site)			■						
TSTC	10. National MAST Video				■					
ALL	11. Joint Review of Deliverables				■					
ALL	12. National Partner Meeting-Review Deliverables					■				
TSTC	13. Steering Committee Meeting						■			
	14. Prepare Administrative Book							■		
	15. Publish Deliverables								■	
	16. Disseminate Deliverables									■

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QUARTERLY REPORT:

MAST Program Summary of Activities and Events
January 1, 1996 - March 31, 1996

Submitted to:
Dr. Jackie Friederich, Education Research Analyst
Ms. Marie Clear Buker, Education Programs Specialist
United States Department of Education
330 C. Street
S.W. Mary Switzer Building
Room 4522
Washington, D.C. 20202
D.O.E. # V199J40008

The status of the MAST project with respect to the stated goals follows:

- **Industrial Assessment:**

  MAST project personnel are completing the final phase of the industry-wide assessment of skills for each of the fifteen occupational specialty areas which are under investigation. The national survey has been completed. Over 3,000 companies were contacted with over 800 agreeing to participate. Statistical analysis confirms that the duties and tasks which had been identified during the industry visits and included in the pilot curricula were right on target.

- **Curriculum Development:**

  Most curriculum research and development has been completed as shown on the MAST deliverables schedule. However, some course revisions are still being made when the national survey and the pilot programs dictate changes. Most curricula is now in its final format and being readied for final deliverables dissemination. MAST personnel expect to continue to revise and update MAST materials until the last volume is sent to the printers for final printing. As of this date, 8 of the 15 volumes have been completed in full draft form and sent to print.

  Plans are being considered by Texas State Technical College to maintain and update the MAST information which has been placed on the internet. This will take some effort and expense but the college feels that it would be well worth the effort to continue the work of the MAST project and keep the internet site current with information regarding skills standards and curriculum development. The college will cover the expenses in this area.

- **Pilot Program:**

  Twenty-five students were initially enrolled in the Manufacturing Engineering Technology Machinist's Certificate program at TSTC. At this time, the number of students is 21. All are doing well and expected to finish the program. Students will be post-tested during the month of June 1996 in order to include the results/evaluation of the pre- and post-tests in the project deliverables along with the final conclusions and analysis of the pilot program. Evaluation of the curricula content and effectiveness is still in progress; however, most curriculum materials have been finalized. Pilot program narratives have been written by each of the development centers and will be included in deliverables books. This narrative describes the pilot program recruitment efforts, student population make-up, results of entry and exit level testing, attrition rate, and job placement information (when available).

- **Student Assessment:**

All MAST students have been assessed for entry level skills and competencies. Students were pre-tested with a general mechanical knowledge test which covered areas such as hand and machine tool operation. As expected, the scores were fairly low (average score was 22.8%). We are expecting scores to be much higher at the end of the program. Copies of the test(s) and test results/analysis will be included in the project deliverables.

- **Project Deliverables:**

Work is progressing according to schedule on all project deliverables. A revised Project Deliverables Gantt Chart (time line) is enclosed in the attached notebook at Tab B. There are no time extensions or deletions to the revised edition. The revision represents added detail.

Work has begun on first edit of all MAST deliverables. Partners have submitted their materials to TSTC for final edit/formatting. Final decisions as to format, appearance, etc. have been determined and all material is being formatted to conform to the MAST standard and 15-volume set of project deliverables. The MAST development centers will review the "first cut" of the entire 15-volume set of materials on April 24, 1996 in Orlando, Florida. This last partners session is being hosted by Dr. Rogers and Central Florida Community College. Development centers will have 30 days to review all materials and submit changes/revisions to TSTC. All 15 volumes will be final edited during the months of May and June 1996. A set of materials will be presented to DOE during the month of June 1996 for their review. The MAST Steering Committee will review these materials in a July 1996 meeting. Final printing and dissemination will commence shortly thereafter.

Work is nearing completion on the MAST Internet Home page. Information which has been placed on the internet includes information about the MAST project, partner colleges and Design and Development Centers, detailed course syllabi for all occupational specialities, SCANS/Course Crosswalks, expected Exit Level proficiencies, Technical Workplace Competencies/Course crosswalks, and industry surveys. The internet address is http://machinetool.tstc.edu.

Respectfully submitted by,

Joe Penick
Joe Penick
MAST Project Director

Enclosures: Winter Parter Development Center Meeting Notebook

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Progress Report for MAST Program
Laser Machining Component
BY
SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

Progress report for second quarter ending March 31, 1996. The following progress has been accomplished:

1. Industrial Assessment:

- All tasks completed.

2. Curriculum development:

- Sources of funding for laboratory equipment are continuing to be pursued through two NSF-ILI grant proposals, industry partnership and/or equipment consignment programs. The NSF-ILI proposals were submitted November 14, 1995. We have not heard the outcome of these grants as of March 31, 1996.
- The competency profile for Modern Optics was revised. This revision expanded the three main tasks into eleven. This will allow for a smoother flow into the MASTER Technical Module format. The Sub-tasks were modified to reflect these changes.
- All syllabi for the laser machining component were reviewed and modified to include SCANS proficiency profiles and data.
- A resource library for Laser Machining is currently being assembled. The major source for materials is The Laser Institute of America (LIA). Materials include the latest texts, journals, and videos on laser machining, laser safety, materials processing, rapid prototyping, and related subjects. The resource library will be housed in the Engineering Technology Division of STCC.

3. Pilot Program

- The pilot program is progressing on schedule. To date, eight (8) courses have been completed with favorable reviews.
- Two field trips were taken to local laser materials processing companies. On Feb. 7th, the

class visited Trumpf Laser in Farmington, CT. Paul Salvo, Director of Marketing, performed a presentation which detailed laser design and materials processing considerations. He also explained and demonstrated Trumpf's product line. A plant tour followed, in which the class was able to see a variety of laser machining applications.

- On April 4th, the class visited Laser Services, Inc. in Westford, MA. Bruce Beauchesne, President, conducted a tour of his laser job shop including the laser machining of ceramics, paper, and various metals using several different types of lasers.

4. Student Assessment

- Pre and Post tests were given for each of the eight courses and will continue for the remaining two courses. Results have been favorable.

5. Program Deliverables

- Laser Machining will constitute Volume 13 of the final MAST-bound deliverables. This volume is currently being finalized.
- The questions posed by Carson Berglund have been completed and forwarded. These responses will be included in the Forward section of the final MAST Project deliverable.
- A remote site training module was completed. This module was for the Refraction at Plane Interfaces segment of Apply Concepts of Modern Optics.
- A MAST promotional video for laser machining is currently being completed. This video will include program information, interviews with STCC alumni and employers, STCC current students, and Department Chairmen. Video clips of laser machining activities will be edited into the production for enhanced effect.
- A career day in Manufacturing Technology is currently being planned for May 14, 1996. This day is part of Manufacturers week as designated by the Governor of Massachusetts (May 13 - 17). This career day will involve approximately 300 high school students, sixteen high-tech manufacturing firms, and eight colleges and universities.

The following activities are being planned for the third quarter:

- Continuation of the pilot program including pre and post testing and course evaluations.
- Development of the resource library will continue. Other sources for materials will be pursued including The Society of Manufacturing Engineers (SME), Institute of Electrical and Electronic Engineers (IEEE), the Optical Society of America (OSA), and International Society of Optical Engineering (SPIE).
- Completion of the MAST video.
- Planning and completion of the May 14th career day.
- Finalization of the first draft of Volume 13 will continue.

MAST ON THE INTERNET

ON LINE RESOURCES AND TOOLS AVAILABLE THROUGH INDUSTRY AND ORGANIZATIONS

Texas State Technical College has an established, excellent working relationship with the members of the National Coalition of Advanced Technology Centers. These relationships enabled the College to determine the on-line resources and tools available in industry and through organizations with common areas of interest.

TSTC has a complete campus wide area network running on a Fiber Distributed Data Interface (FDDI) backbone. This Wide Area Network integrates many types of computing platforms. The Campus Area Network is composed of FDDI (100Mbps) for the Campus Wide Backbone and over 50 Separate Ethernets (10 Mbps) supporting instructional labs and administrative offices. TSTC also is connected to the Internet via a T1 (1.544 Mbps) digital data line to the Texas Higher Education Network (THEnet) operated by the University of Texas System Telecommunications Office. The campus area network is multi protocol using TCP/IP, Novell IPK, and AppleTalk. The experience of the faculty and staff gained through use of the Internet enabled the staff to supply the deliverables for this project.

Research was conducted via mail and telephone to determine beneficial on-line resources and tools available in industry and through organizations with common areas of interest. In addition to the on-line resources and points of contact, the MAST curriculum is located via the Home Page. Example MAST Internet is attached.

The MAST Home Page address is http://machinetool.tstc.edu.

October 26, 1995

Contact Person
Business or Industry Address

Dear----------.

The National Coalition of Advanced Technology Centers (NCATC) has as its mission to promote the infusion of proven advanced technology in American industries through community and technical colleges. The Coalition specifically functions as a network of mutual support to help Advanced Technology Centers (ATC's) achieve their fullest potential as mechanisms for technology application, education, and training. In addition, it provides access to planning and development resources required to launch new ATC's as well as opportunities for other organizations to participate in its workshops, conferences, and activities. The Coalition sponsors an official liaison to the National Institute of Standards and Technology (NIST) to serve as a guest researcher and advisor to the federal government on workforce issues.

Texas State Technical College, along with five other community and technical colleges across the United States, has been awarded a Technology Reinvestment Project (TRP) grant by the National Coalition of Advanced Technology Centers (NCATC) in conjunction with the Center for Occupational Research and Development (CORD) to create an Internet resource for the machine-tool, precision manufacturing, and metals related industries. This Internet resource, available to business and industry, will be a "linkage" of on-line information with databases detailing available training resources; surplus, new, and used industrial equipment and machinery available; advanced technology machine tools in development; a manufacturers database with sources of products, services, suppliers, fabricators, repair facilities, and other types of services to industry both domestic and international.

Texas State Technical College has conducted an Internet search to identify these resources and is creating an Internet Home Page for business and industry to access this information. This Internet information will be an invaluable resource to American industry and technology educators.

The purpose of this letter is to ask for your assistance in identifying additional resources which may be available and be considered for inclusion into the Internet Machine-Tool Linkage project. Please take a moment of your valuable time to complete the enclosed postage pre-paid survey card. In return, once the Internet Linkage project is complete, I will send you the Internet address so you can easily access this important information. Thank you.

Appreciatively,

Terry Sawma
Texas State Technical College

Machine Tool & Precision Manufacturing Technology Curriculum Research

Texas State Technical College - Waco, Texas

MAST Program...

MAST is a Department Of Education grant to develop and demonstrate a national training model for new technologies and manufacturing processes for precision manufacturing and the machine tool industries.

MASTER Program...

MASTER is a National Science Foundation grant to develop the educational resources necessary for implementing the national training model for new technologies and manufacturing processes for precision manufacturing and the machine tool industries.

Related Machine Tool Links...

Specific "non-commercial sites" pertaining to machine tool technologies.

This site made possible through two (2) TRP (Technology Reinvestment Project) grants awarded by:

the National Coalition of Advanced Technology Centers (NCATC)
and Center for Occupational Research and Development (CORD).

WEB counter says that you are visitor number 2405

Send comments to:
Wallace Pelton
Last Updated 7-1-96

Machine Tool Advanced Skills Curriculum Project

Grant Methodologies	Key Partners
The Survey	Competency Profiles
Project Deliverables	

- What is this all about?
- Who should participate as partners?
- Why is there a need for this project?
- Problems confronting industry
- Issues to be addressed
- Key Goals of this project

What is this all about?

Skills standards research and development comes from a conviction that technology and market changes have caused significant modifications in the types of skills and behaviors needed by workers on the job. This conviction has motivated a broad education reform movement that involves changes in curriculum and pedagogy and seeks to tie education more closely to the emerging needs of the workplace. Industry-based skill standards are a crucial component. Skill standards will strengthen the educational system and will become a critical part of reform efforts in the workplace. Working together, educators and employers will get a chance to re-examine not only their relationships with each other, but activities within their own organizations.

Skill shortages in advanced technologies severely limit the productivity of the American machine tool industry. *This national need necessitates the training of multi-skilled machine technicians capable of installing, integrating, maintaining, diagnosing, repairing, and modifying technologically advanced equipment systems.*

The Machine Tool Advanced Skills Curriculum Project is a geographic partnership of seven of the nation's best two-year technical and community colleges located in seven states that have about one-third of the density of metals-related industries in the United States. This project will develop and disseminate a national training model for manufacturing processes and new technologies and within the American machine tool industry.

Who should Participate as Partners?

Individuals in education and industry who desire to learn more about the rapidly changing needs of technology driven machine tool and metals related manufacturing industries, and the ways to obtain and educate skilled people for these jobs.

Why is there a Need for this Project?

Skill shortages continue to severely limit the productivity within the American machine tool industry. This national need necessitates the training of multi-skilled machine technicians capable of installing, integrating, maintaining, diagnosing, repairing, and modifying technologically advanced equipment systems. The survival of existing industries and the successful introducing of new manufacturing enterprises with advanced technologies require the development of innovative training, new curricula and methodologies.

Problems Confronting Industry

- ☐ Lack of clearly defined standards for the machine tool industry;
- ☐ Low academic skills levels;
- ☐ Lack of employability skills by many applicants;
- ☐ Lack of qualified applicants for training and apprenticeship;
- ☐ Availability and scheduling of work-based training;
- ☐ Productivity issues (equipment operations limited by worker capabilities);
- ☐ Need for flexible training approaches for special populations and adult learners.

Issues to be Addressed

- ☐ Increase awareness of secondary school students of career opportunities in machine tool andmetals related industries;
- ☐ Develop a School-to-Work programs for secondary students with planned training and apprenticeships;
- ☐ Offer out-of-school unemployed, and existing industry employees the opportunity to learnnew skills;
- ☐ Provide the environment for specific workplace training experiences.

- ☐ Establish curricula standards with industry validated competencies and apprenticship/internships with industrial partners (workplace training experiences as capstones of curricula).

Goals of this Project

- ☐ Industrial assessment (industry validated skills standards and expectations)
- ☐ Curriculum development for training and apprenticeship
- ☐ Pilot program to be designed and implemented
- ☐ Student assessment and evaluation
- ☐ Project deliverables (skill standards and curriculum/training materials)

For More Information - Contact

Wallace Pelton
Joe Penick

For more information, call (817) 867-3526

Last modified by
Wallace Pelton

Machine Tool Grant Methodologies

SCANS Competencies | Technical Competencies | Syllabi lists

Machine Tool Grant Methodology

COMPETENCY PROFILE

1. The occupational survey methodology was designed to build on the strength of the participating colleges' relationship with industry in order to ensure the relevance and credibility of the skills standards and model curricula. Given the compressed time frame for conducting the industry survey, it was agreed that the consortium partners would employ a modufied version of the widely-used DACUM (Developing A Curriculum) process to identify the major types of skills required for employment in the occupational areas. We called this modified DACUM a "Competency Profile".
2. The Competency Profile Duties and Tasks have been identified by practitioners in the trade and are therefore "industry driven." A modified DACUM was performed at industry sites and facilitated by representatives of each development center. Panel members were identified on the Competency profile. Panel members were requested to identify job entry level skills and competencies, rank each Duty and Task, and identify the expected "sub-tasks" required to perform each Task within a given Duty. A complete list of industry generated Duties and Tasks has been prepared for each occupational specialty and entitled "Technical Workplace Competencies".
3. Additional skills for Mathematics, Science, and General Education courses were also identified by the panel members. The panel generated a list of "Skills and Knowledge", "Traits and Attitudes", and "Future Trends and Concerns" and are listed on the Competency Profiles.
4. Once final "industry validated" copy was secured, project personnel prepared extended course syllabi reflecting the industry's expectations of technical competencies, SCANS skills, and expected exit level proficiencies for each specific occupational specialty.

COMPETENCY COURSE CROSSWALK

5. Once the Technical Competencies were identified a "Technical Workplace Competency/Crosswalk" was prepared identifying each required course in the curriculum and the specific tasks which were taught in each respective course. An "Exit Proficiency Level Matrix" was developed for the Technical Workplace Competencies and each task was assigned an expected proficiency level at minimum performance level expectations of industry. The preparation of the "Technical Workplace Competency/Crosswalk allowed faculty to review, modify, and adjust course syllabi to meet the expected exit level proficiencies.
6. Skill standards development projects generally follow either one of two basic approaches to documenting skill standards. One is referred to as the *skill components model* and the other as the *professional model*. These two models differ along two dimensions -- the conceptualization of the skill and the role of workers in the development and governance of the standards system. Professional Model: The performance and responsibilities of professional workers are not characterized by dividing their jobs into a list of discrete tasks or skills and then adding up tasks that the professional has mastered. The nuances of their roles and responsibilities make marrowly defined listings of their skills difficult to define. Generally, most reqauire government and/or state certification boards and formal testing and experience duration requirements. Skill Component Model: This model is based on the limited roles that front line workers are expected to carry out in

traditional hierarchial organizations. Although this approach tends to focus on duties and tasks, and not on the work characteristics expected of an employee in a high performance organization, it is most often used by national pilot programs to document skills standards by occupation. This project used the Skill Components Model in its methodology. To help overcome the shortfalls of this model, soft skills were infused in the form of SCANS to ensure all the required skills were addressed.

SCANS/COURSE CROSSWALK

7. These soft skills are often referred to as advanced generic skills or SCANS skills (named after the U.S.Secretary of Labor's 1991 Commission on Achieving Necessary Skills). They are based on the recognition of the inadequacy of previous perspectives on skills. Although they differ from the skill components model, they do represent potential to expand the conceptualization of skills.
8. SCANS Competencies and specific classroom activities to address each SCANS Competency have ben identified for each of the technical courses, the general education courses and the remediation courses and are included in the methodology.

INDUSTRY WIDE ASSESSMENT

1. Industry on-site visits involved a tour of facilities, review of pertinent job descriptions, and a modified DACUM process resulting in a Competency Profile for each occupational speciality. Employers and employees described expectations of worker skills, identified current required skills, and projected future trends. Employers in respective occupational specialties voiced their expectations for training of future employees.
2. A description of duties and specific tasks for each occupational speciality was prepared, prioritized, and validated by the Company Team. The project staff acted primarily as facilitators in the process responsible for documenting the comments and preparing the occupational skills profiles.
3. Employers stated their expectations of any training programs and apprenticeships that could lead to employment within their company. Expectations for prerequisites and knowledge of math, sciences, and general education were also expressed for each occupational speciality. A list of structured questions was presented to each group, and sessions were tape-recorded for later transcription and review.
4. Companies would review and edit these documents, return them to the institution who would then input the data on "PageMaker" software. A Competency Profile was prepared for the participating company with their company logo and names of panel members.
5. Once specific company skills standards had been completed with all named partners in each region, a national survey was mailed to other companies, targeted to respondents who are identified, prepared, and willing to participate in this national survey.
6. From this process an industry validated composite skills standard document was be developed. A final review was held with invited and interested participants hosted by a nation-wide advisory committee. This was scheduled as a final and open forum on the specific occupational skills profiles. Skills standards were also be reviewed by organized labor groups, state agencies, professional societies, and other interested national groups.
7. Skills standards for each occupational speciality were field tested for feasibility of training and delivery to educational institutions and trade groups, and finally printed in graphical format for dissemination to companies, educational institutions and other training providers.
8. Public schools participanted in the process from the beginning, served on steering committees, provided development experiences for the faculty and counselors, and expended the vision of young people to provide knowledge of career opportunities in these occupational specialities.

PHASE II

1. The second phase (1995-96) of the project included curricula revisions by institutions and training providers and field testing of the revised curricula with students recruited as experimental groups.
2. Students were both pre-tested and post-tested to assess the knowledge gained and mastery of competencies from these enhanced educational experiences and eventual success ratings in employment industries.
3. Apprenticeship experiences were also be defined and enhanced as part of the process. It is know that internships and apprenticeships currently lack definition and documentation of value-added experiences.

Last modified by
Wallace Pelton

Machine Tool Advanced Skills Technology SCANS

Machinist	Computer-Aided Drafting Technician	CIM Technician	Computer Networking & Systems Technician
Electrical Systems Technician	Industrial Maintenance Mechanic	Instrumentation & Control Technician	Laser Machinist
CNC Machinist	Manufacturing Engineering Technician	Mold Maker	Non Metallics/Composites Processing Technician
Sheetmetal/Aircraft Structural Technician	Superabrasives, Conventional & EDM Grinding Technician	Tool & Die Maker	Welder

Last modified by
Wallace Pelton

SCANS/Course
CROSSWALK
MACHINIST: CERTIFICATE
CIP: 48.0501

1. College Success Skills	6. Machine Tool Practices II	11. Manufacturing Processes
2. Machine Tool Practices I	7. Oral/Written Communications	12. Introduction to CNC
3. Precision Tools & Measure	8. Survey of Weld. Proc./Applic.	13. Machine Tool Practices IV
4. Industrial Specs. & Safety	9. Human Relations	14. Advanced CNC
5. Occupational Math	10. Machine Tool Practices III	15. Exit Proficency Level

Numbers 1-14 below match the courses above. Number 15 refers to the Exit Proficency Level.

COMPETENCY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
(RS) RESOURCES:															
A. Allocates time	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3
B. Allocates money		x	x	x		x		x		x	x	x			2
C. Allocates material and facility resources	x	x	x	x		x		x		x	x	x	x	x	4
D. Allocates human resources	x	x		x		x	x		x	x	x	x	x	x	1
(IN) INTERPERSONAL SKILLS:															
A. Participates as a member of a team	x	x	x	x	x	x	x	x	x	x	x	x	x	x	4
B. Teaches others	x	x	x	x		x	x	x	x	x	x	x	x	x	1
C. Serves clients/customers	x	x		x		x		x	x	x	x	x	x	x	2
D. Exercises leadership	x	x	x	x		x		x	x	x	x	x	x	x	1
E. Negotiates	x			x				x	x		x				1
F. Works with cultural diversity	x	x	x	x	x	x	x	x	x	x	x	x	x	x	4

(IF) INFORMATION SKILLS:															
A. Acquires and evaluates information	x	x	x	x	x	x	x	x	x	x	x	x	x	x	4
B. Organizes and maintains information	x	x	x	x	x	x	x	x	x	x	x	x	x	x	4
C. Interprets and communicates information	x	x	x	x	x	x	x	x	x	x	x	x	x	x	4
D. Uses computers to process information			x		x		x					x		x	2
(SY) SYSTEMS:															
A. Understands systems	x	x	x		x	x	x	x	x	x	x	x	x	x	4
B. Monitors and corrects performance		x	x			x	x	x		x	x	x	x	x	2
C. Improves and designs systems		x	x			x		x		x	x	x	x	x	1
(TE) TECHNOLOGY:															
A. Selects technology		x	x	x	x	x	x	x		x	x	x	x	x	4
B. Applies technology to task		x	x	x	x	x	x	x		x	x	x	x	x	4
C. Maintains and troubleshoots technology		x	x	x		x		x		x	x	x	x	x	3
Numbers 1-14 below match the courses above. Number 15 refers to the Exit Proficency Level.															
FOUNDATION SKILLS	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
(BS) BASIC SKILLS:															
A. Reading	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3
B. Writing	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3
C. Arithmetic and mathematics	x	x	x	x	x	x		x		x	x	x	x	x	4
D. Listening	x	x	x	x	x	x	x	x	x	x	x	x	x	x	4

E. Speaking	x	x	x	x	x	x	x	x	x	x	x	x	x	x	4
(TS) THINKING SKILLS:															
A. Creative thinking	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3
B. Decision making	x	x	x	x	x	x	x	x	x	x	x	x	x	x	2
C. Problem solving	x	x	x	x	x	x	x	x	x	x	x	x	x	x	2
D. Seeing things in the mind's eye	x	x	x	x	x	x	x	x	x	x	x	x	x	x	4
E. Knowing how to learn	x	x	x	x	x	x	x	x	x	x	x	x	x	x	4
F. Reasoning	x	x	x	x	x	x	x	x	x	x	x	x	x	x	4
(PQ) PERSONAL QUALITIES:															
A. Responsibility	x	x	x	x	x	x	x	x	x	x	x	x	x	x	4
B. Self-esteem	x	x	x	x	x	x	x	x	x	x	x	x	x	x	4
C. Social	x	x	x	x	x	x	x	x	x	x	x	x	x	x	4
D. Self-management	x	x	x	x	x	x	x	x	x	x	x	x	x	x	4
E. Integrity/honesty	x	x	x	x	x	x	x	x	x	x	x	x	x	x	4

EXIT LEVEL OF PROFICIENCY					
Technical Workplace Compentency	1	2	3	4	5
	rarely	routinely with supervion	routinely with limited supervision	routinely without supervision	initiates / improves / modifies and supervises others

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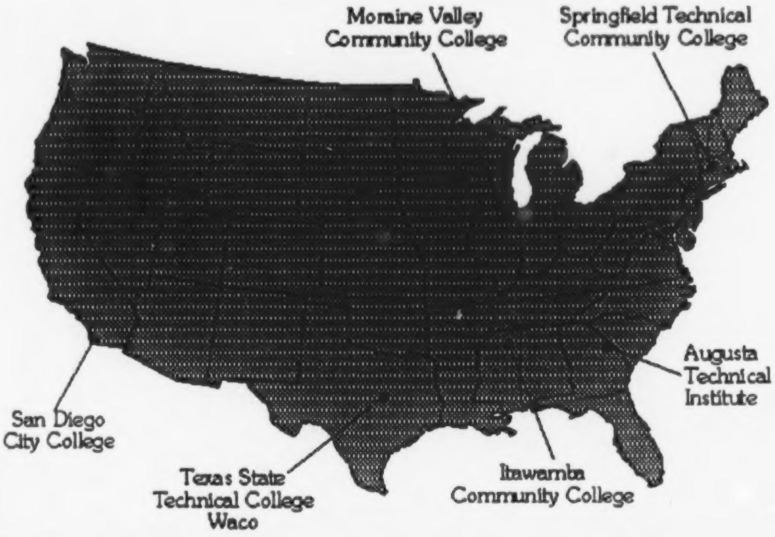
Machine Tool Advanced Skills Curriculum Project Partners

For further information, click on desired college.


Moraine Valley Community College
Springfield Technical Community College
Augusta Technical Institute
San Diego City College
Texas State Technical College Waco
Itawamba Community College

Six States in Partnership Program

- ☐ Augusta Technical Institute, GA
- ☐ Itawamba Community College, MS
- ☐ Moraine Valley Community College,IL
- ☐ San Diego City College, CA
- ☐ Springfield Technical Community College, MA
- ☐ Texas State Technical College Waco, TX

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SURVEY RESULTS

MAST personnel visited numerous companies throughout the United States. Visits were also made to many of the Federal Labs and to other technical colleges. These visits provided opportunities to interview "expert workers" in each of the occupational specialty areas for which MAST was responsible. For each of these visits MAST personnel prepared an individualized Competency Profile. This Competency Profile was actually a "picture" of the occupation at that company. These individual Competency Profiles were analyzed and eventually brought together to form a composite Competency Profile, which represented a "picture" of the occupation on a national level.

Even though numerous company interviews were conducted, MAST personnel understood that the interview technique would still fall short of providing a "true" picture of each of these occupations. Restrictions of time and money for travel would seriously limit the achievement of a representative sample via on-site interviews. The mailed survey allowed MAST to contact a much larger number of companies in a much shorter time while staying within the monetary restrictions of the MAST grant. What follows is a narrative of the methodology, findings and conclusions of this survey.

SURVEY METHODOLOGY

Survey instruments were prepared for each occupational area under investigation by MAST (copies of each survey are found in this tab). MAST personnel worked with the staff of Institutional Research and Planning at Texas State Technical College, to plan, design and produce the survey forms. Institutional Research and Planning has the primary role of conducting surveys and performing survey analysis on the TSTC campus. Personnel in this office are qualified in operations research/statistical analysis of data for industry and technical college curriculum and training material development. The survey was designed to solicit two kinds of information. Page one of each survey requested demographic information about the company. The remaining pages included the duties and tasks for each occupational specialty. These duties and tasks had been previously identified through company interviews, previous surveys, faculty input, and other research methods.

The survey process was divided into two phases. Phase 1 was used as a pilot survey for Phase 2. Phase 1 was a survey for just the State of Texas. Part 2 was a survey for the entire U.S. What follows is the survey methodology, analysis and conclusions from each of the surveys.

phase 1 - THE TEXAS SURVEY

METHODOLOGY

342 Texas companies were identified using the latest edition of the Directory of Texas Manufacturers, which is published by the Bureau of Business Research at the University of Texas in Austin. This sampling of industries was selected based on SIC codes, number of employees and other factors. From this selection process a mailing list was prepared.

These companies were mailed a cover letter, which briefly explained the MAST grant, the purpose of the survey, and requested their participation in the Texas survey. Along with this cover letter, a card was sent which listed the occupational areas being surveyed. Companies were asked to check which surveys they would be willing to complete and return the cards to the MAST office at TSTC in Waco, Texas. When these cards were received in the MAST office, the appropriate surveys were mailed to the participating companies.

MAST personnel made follow-up calls to industry representatives as a means of insuring that the highest number of surveys would be completed and returned. The cut-off date for receiving completed surveys was December 1, 1995. All returned surveys were sent to Institutional Research and Planning for scanning and analysis.

ANALYSIS

- ☐ Number of companies targeted for the Texas survey - Letters and cards were sent to 342
- ☐ Texas companies
- ☐ Number of cards received back indicating willingness to participate in the survey - 68
- ☐ Completed surveys received by MAST - 68
- ☐ **Percentage of companies participating - 19.8%**

CONCLUSIONS

As a result of conducting the Texas Survey, MAST identified several important points.

- ☐ Most of the information which was gathered from industry visits/interviews was accurate.

The curriculum was modified where necessary based upon the survey.

- ☐ The curriculum/syllabi which MAST had developed as part of the deliverables appears to be tailored for precision manufacturing within the state, now and in the immediate future.

- ☐ We see that industry within the State of Texas is appears to be holding on to many of the older technologies, methods and industries (oil tool, heavy manufacturing etc.)

- ☐ Lessons learned from the Texas Survey which will be used to improve the National Survey are as follows:

A. Telephone contact with the industry to establish a personal commitment to do the survey and to identify by name the industry point of contact is absolutely imperative to getting a reasonable number of returns.

B. The two step system with an enclosed card used in the Texas survey added to the duration of the overall process and may have actually decreased industry input. The process was streamlined for the National Survey.

phase 2 - THE NATIONAL SURVEY

METHODOLOGY

MAST project staff identified 274,368 companies nationwide using a software package called *Select Phone-CD*. This software includes over 95 million U.S business and residential listings on 6 CD-ROM disks. The disks separate the listings by regions (central, south, Great Lakes, northeast, mid-atlantic, and pacific). The telephone listings can be sorted in many ways including by state, address, zip code, and SIC codes. Each of the regional listings was sorted by SIC codes, as had been done for the Texas survey. MAST obtained six separate databases (one for each region) from this sorting operation. These data base files were combined and a 1.5% random sampling was done using both database and statistical software packages (*Paradox* and *SPSS*). This sampling netted 3,216 companies which were targeted for the survey.

A telephone bank was set up on the TSTC campus and each of the 3,216 companies were called and asked to participate in the MAST national survey. Each company which agreed to participate was mailed a packet containing the survey(s) for each occupational specialty area requested.

As the surveys were returned, they were sorted (by occupational specialty) and scanned into the computer for statistical analysis using a statistical software package (*SPSS*).

ANALYSIS

- ☐ Number of companies identified (by SIC code) using *Select Phone-CD* - 274,368
- ☐ Number of companies targeted for the National survey (1.5% random sample) - telephone calls were made to the 3,216 national companies identified by the sampling process
- ☐ Number of companies which agreed to participate in the MAST national survey - 1,127
- ☐ Number of completed surveys received by MAST - 886
- ☐ **Percentage of companies participating - 27.5 %**

CONCLUSIONS

The purpose of the national survey was to validate which duties and tasks needed to be addressed in each occupational composite competency profile and in the supporting course syllabi. Generally any task with a weighted average of 1.50 or below was dropped from the course syllabi. Any task rated from 1.5 to 2.00 was critically evaluated for inclusion based upon total hours available for instruction and lab work. Very few tasks were tailored or cut down in scope that had a weighted average of 2.00 to 2.50 overall. All tasks with a 2.50 or above are fully addressed in the MAST syllabi.

We attempted to follow accepted practices associated with statistical analysis of this data. When the frequency of the responses were too low, or when the responses were not spread in a normal pattern, a clear determination could not be made as to the validity of the input. At that point we made a subjective call, based upon our experience in that particular area, as to whether the task should be addressed and how much time should be devoted to it's study.

As a result of conducting the national survey, MAST project staff determined the following:

- ☐ Most technicians in all fields are performing a narrow range of tasks (operators as opposed to technicians).
- ☐ Production methodologies tend to be dated.
- ☐ Very little cross training of technicians (machinist with marginal measurement requirements, i.e. operators not technicians) is occurring.

☐ Response from companies that manufacture/assemble parts or products in batch runs of a dozen to a few hundred dominate the survey, but all types of companies were well represented.

☐ In all areas there was an average of only 8% of the employees in the 20-29 year age bracket.

☐ Approximately 50% of employees are in the age bracket 30-49.

☐ Approximately 42% of employees are over 50 years old (indicates an aging population).

☐ The education level of 64% of all employees is high school level or less.

☐ Only 8% of the companies surveyed are unionized.

☐ OJT is provided by 70% of the companies surveyed.

☐ Internship agreements were present in only 12% of the firms surveyed.

The Texas and National Surveys not only gave us an opportunity to validate each task in each of the 15 occupational composite competency profiles (1,140 tasks overall), it also provided useful demographic data. Further, we spoke via telephone to 3,216 companies in the precision manufacturing business, some small (35% with less than 10 employees) and some large (27% with 100 or greater).

The story that the demographics paints is reinforced by the telephone conversations with plant managers and first line supervisors. **The message we received from the machine tool industry is powerful.**

1. There are no viable, broad national apprenticeship programs.
2. Most practice OJT because they have no good, reliable source for trained technicians. The community and technical colleges do not produce enough to fill the need.
3. Most feel that their operators are severely undertrained and do not utilize the equipment to its fullest capability.
4. Our industrial technicians are aged with an inadequate number of replacements being trained (42% are over 50 years of age, 50% are 30-39, with only 8% below age 30).

Machine Tool Advanced Skills Technology Competency Profiles

Machinist	Manufacturing Engineering Technician	Mold Maker	Welder
Industrial Maintenance Mechanic	Sheet Metal Non-Metallics Composite Technician	Tool and Die Technician	CADD Technician
CNC/CAM Technician	Instrumentation Technician	LASER Machinist	Automated Equipment Technician

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Machinist

Competencies Profile

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plan, layout, setup, and operate hand and machine tools to perform machining operations necessary to produce a workpiece to referenced engineering standards.

Duties	Tasks			
A-PRACTICE SAFETY	A-1 Follow Safety Manuals and All Safety Regulations/ Requirements	A-2 Use Protective Equipment	A-3 Follow Safe Operating Procedures for Hand and Machine Tools	A-4 Maintain a Clean and Safe Work Environment
B-APPLY MATHEMATICAL CONCEPTS	B-1 Perform Basic Arithmetic Functions	B-2 Interconvert Fractions/Decimals	B-3 Interconvert Metric/English measurements	B-4 Perform Basic Trigonometric Functions
	B-5 Calculate Speeds and Feeds for Machining	B-6 Locate Machining Points from a Datum Point	B-7 Perform Calculations for Sine Bar and Sine Plate	B-8 Calculate for Direct, Simple, and Angular Indexing
	B-9 Perform Calculations Necessary for Turning Tapers	B-10 Solve for Little "H"		
C- INTERPRET ENGINEERING DRAWINGS AND CONTROL DOCUMENTS	C-1 Review Blueprint Notes and Dimensions	C-2 Identify Basic Layout of Drawings	C-3 Identify Basic Types of Drawings	C-4 List the Purpose of Each Type of Drawing
	C-5 Verify Drawing Elements	C-6 Practice Geometric Dimensioning and Tolerancing (GD&T) Methodology	C-7 Describe the Relationship of Engineering Drawings to Planning	C-8 Use Standards to Verify Requirements
	C-9 Analyze Bill of Materials (BOM)	C-10 Understand and Use Quality Systems		

D-RECOGNIZE DIFFERENT MANUFACTURING MATERIALS AND PROCESSES	D-1 Identify Materials With Desired Properties	D-2 Describe the Heat Treating Process	D-3 Perform Heat Treating Operations	D-4 Test Metal Samples for Hardness
	D-5 Identify Types of Plastic Materials and Processes			
E-PERFORM MEASUREMENT/ INSPECTION	E-1 Identify Types of Measurement	E-2 Select Proper Measurement Tools	E-3 Apply Proper Measuring Techniques	E-4 Use Metric and English Standards of Measurement
	E-5 Perform Measurements With Hand Held Instruments	E-6 Perform Measurements on Surface Plate	E-7 Perform Inspections Using Stationary Equipment	
F-PERFORM CONVENTIONAL MACHINING OPERATIONS	F-1 Prepare and Plan For Machining Operations	F-2 Use Proper Hand Tools	F-3 Operate Power Saws	F-4 Operate Drill Presses
	F-5 Operate Vertical Milling Machines	F-6 Operate Horizontal Milling Machines	F-7 Operate Metal Cutting Lathes	F-8 Operate Grinding/Abrasive Machines
	F-9 Operate Jig Boring Machines	F-10 Operate Deburring Equipment		
G-PERFORM ADVANCED MACHINING PROCESSES	G-1 Prepare and Plan For CNC Machining Operations	G-2 Select and Use CNC Tooling Systems	G-3 Program CNC Machines	G-4 Operate CNC Machining Centers (Mills)
	G-5 Operate CNC Turning Centers (Lathes)	G-6 Operate Electrical Discharge Machines		
H-PERFORM GEAR CUTTING OPERATIONS	H-1 Describe the Different Types of Gears	H-2 Understand Gear Terms	H-3 Use Rotary Tables and Dividing Heads	H-4 Discuss Gear Inspection and Measurement
	H-5 Machine a Spur Gear			

I-PERFORM WELDING OPERATIONS	I-1 Weld With Shielded Metal Arc Welding (SMAW) Process	I-2 Weld/Cut With Oxyacetylene	I-3 Weld With Gas Tungsten Arc Welding (GTAW) (Heliarc)	I-4 Weld With Gas Metal Arc Welding (GMAW)/(MIG) and Flux Core Arc Welding (FCAW)

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Manufacturing Engineering

Competency Profile

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use special knowledge and skills to recommend and/or implement solutions for specific manufacturing applications

A. PRACTICE SAFETY	A-1. Follow Safety Manuals and All Safety Regulations/Requirements	A-2. Use Protective Equipment	A-3. Follow Safe Operating Procedures for Hand and Machine Tools
	A-5. Control Fire Hazards	A-6. Apply American Red Cross First Aid and CPR Procedures	A-7. Recommend Hazardous Waste Management Techniques
	A-9. Demonstrate Knowledge of State and Federal EPA Regulations		
B. APPLY MATHEMATICAL CONCEPTS	B-1. Perform Basic Arithmetic Functions	B-2. Interconvert Fractions/Decimals	B-3. Interconvert Metric/English Measurements
	B-5. Perform Basic Trigonometric Functions	B-6. Calculate Speeds and Feeds for Machining	B-7. Locate Machining Points from a Datum Point
	B-9. Calculate for Direct, Simple, and Angular Indexing	B-10. Perform Calculations Necessary for Turning Tapers	B-11. Solve for Little "H"
	B-13. Solve Engineering Equations	B-14. Solve Static Systems for Resultant Force	B-15. Determine Strength of Materials for Various Applications

C. INTERPRET ENGINEERING DRAWINGS AND CONTROL DOCUMENTS	C-1. Review Blueprint Notes and Dimensions	C-2. Identify Basic Layout of Drawings	C-3. Identify Basic Types of Drawings	
	C-5. Verify Drawing Elements	C-6. Practice Geometric Dimensioning and Tolerancing (GD&T) Methodology	C-7. Describe the Relationship of Engineering Drawings to Planning	
	C-9. Analyze Bill of Materials (BOM)	C-10. Understand and Use Quality Systems		
D. RECOGNIZE DIFFERENT MANUFACTURING MATERIALS AND PROCESSES	D-1. Identify Materials With Desired Properties	D-2. Identify Materials and Processes to Produce a Product	D-3. Describe Heat Treating Processes	
	D-5. Test Metal Samples for Hardness	D-6. Describe Casting Processes	D-7. Describe Hot Working Processes	
	D-9. Evaluate Alternative Manufacturing Processes			
E. DEMONSTRATE MEASUREMENT/INSPECTION TECHNIQUES	E-1. Identify Types of Measurement Used in Manufacturing	E-2. Select Proper Measurement Tools	E-3. Apply Proper Measuring Techniques	a
	E-5. Perform Measurements With Hand Held Instruments	E-6. Perform Measurements on Surface Plate	E-7. Perform Inspections Using Stationary Equipment	
F. PERFORM CONVENTIONAL MACHINING OPERATIONS	F-1. Prepare and Plan For Machining Operations	F-2. Use Proper Hand Tools	F-3. Operate Power Saws	
	F-5. Operate Vertical Milling Machines	F-6. Operate Horizontal Milling Machines	F-7. Operate Metal Cutting Lathes	
G. PERFORM ADVANCED MACHINING PROCESSES	G-1. Prepare and Plan For CNC Machining Operations	G-2. Select and Use CNC Tooling Systems	G-3. Program CNC Machines	
	G-5. Operate CNC Turning Centers (Lathes)	G-6. Operate Electrical Discharge Machines	G-7. Download Programs Via Network	
H. PERFORM GEAR GENERATING OPERATIONS	H-1. Describe the Different Types of Gears	H-2. Understand Gear Terms	H-3. Use Rotary Tables and Dividing Heads	l

I. PERFORM WELDING OPERATIONS	I-1. Weld With Shielded Metal Arc Welding (SMAW) Process	I-2. Weld/Cut With Oxyacetylene	I-3. Weld With Gas Tungsten Arc Welding (GTAW) (Heliarc)	I (a
	I-5. Perform Plasma Arc Cutting (PAC)			
J. PERFORM DRAFTING TASKS.	J-1. Demonstrate Traditional Mechanical Drafting Skills	J-2. Use Computer-Aided Drafting (CAD) System	J-3. Create 3-D Solid Models	J
K. USE COMPUTERS	K-1. Use Computer Operating Systems	K-2. Use Computer Inquiry Systems	K-3. Use Various Computer Applications	a
	K-5. Use Computer-Aided Engineering System			
L. PARTICIPATE IN TOTAL QUALITY AND SPC ACTIVITIES	L-1. Define Quality in Manufacturing and Explain Importance	L-2. Implement Concepts of Quality in the Workplace	L-3. Apply Principles and Tools of Continuous Quality Improvement	a
	L-5. Evaluate Data to Monitor Production	L-6. Analyze Customer Problems and Recommend Solutions	L-7. Establish Methods, Plans and Procedures to Maintain Quality	
M. MAINTAIN ELECTRICAL DEVICES	M-1. Use Electrical Test Equipment	M-2. Apply Specific Terms to Electrical Circuits	M-3. Analyze Series, Parallel and Complex DC/AC Circuits	a
	M-5. Inspect Transformers and Generators	M-6. Discuss Sensors and Feedback Technology	M-7. Set Up/Program PLC	
N. MAINTAIN HYDRAULIC/PNEUMATIC DEVICES	N-1. Use Test Equipment	N-2. Describe Basic Principles of Hydraulic Systems	N-3. Identify Hydraulic Fluids	
	N-5. Recognize Pumps, Actuators, and Hydraulic Control Devices	N-6. Troubleshoot Hydraulic/Pneumatic Systems		

Mold Maker

Competency Profile

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.plan, layout, setup, and operate hand and machine tools to perform operations necessary for machining a new mold or repairing/modifying an existing mold to referenced design standards

A. PRACTICE SAFETY	A-1. Follow Safety Manuals and All Safety Regulations/Requirements	A-2. Use Protective Equipment	A-3. Debur Mo Bases to Help Avoid Cuts
B. APPLY MATHEMATICAL CONCEPTS	B-1. Perform Basic Arithmetic Functions	B-2. Locate Machining Points from a Datum Point	B-3. Interconv Fractions/Deci
	B-5. Perform Basic Trigonometric Functions	B-6. Use Sine Bar or Sine Plate for Machine Operations	B-7. Calculate Draft Angles
	B-9. Apply "Shrink Rate" Formulas	B-10. Calculate for Direct, Simple, and Angular Indexing	B-11. Calculat Speeds and Fee for Machining
C. INTERPRET ENGINEERING DRAWINGS AND CONTROL DOCUMENTS	C-1. Review Blueprint Notes and Dimensions	C-2. Identify Basic Layout of Drawings	C-3. Identify B Types of Drawi
	C-5. Verify Drawing Elements	C-6. Identify Lines and Symbols (GD&T)	C-7. Describe t Relationship of Engineering Drawings to Planning
	C-9. Analyze Bill of Materials (BOM)	C-10. Create Technical Sketches	
D. SELECT MANUFACTURING MATERIALS AND PROCESSES	D-1. Identify Materials With Desired Properties	D-2. Identify Heat Treating Processes	D-3. Perform Treating Operations
	D-5. Evaluate Alternative Manufacturing Processes	D-6. Identify Types of Plastic Materials	D-7. Identify Plastic Moldin Processes
	D-9. Use Pantograph for Mold Engraving		

E. PERFORM MEASUREMENT/INSPECTION	E-1. Identify Types of Measurement	E-2. Select Proper Measurement Tools	E-3. Apply Pro Measuring Techniques
	E-5. Measure/Layout/Inspect Using Surface Plate	E-6. Inspect Using Stationary Equipment (e.g., CMM and optical comparator)	
F. PERFORM CONVENTIONAL MACHINING OPERATIONS	F-1. Prepare and Plan For Machining Operations	F-2. Use Proper Hand Tools	F-3. Operate Power Saws
	F-5. Operate Vertical Milling Machines	F-6. Operate Horizontal Milling Machines	F-7. Operate Cutting Lathes
	F-9. Operate Jig Boring Machines	F-10. Operate Deburring Equipment	F-11. Polish M Cavities
G. PERFORM ADVANCED MACHINING PROCESSES	G-1. Program Computer Numerical Control (CNC) Machines	G-2. Operate CNC Machining Centers and Turning Centers	G-3. Operate Electrical Discharge Machines
H. PERFORM WELDING OPERATIONS	H-1. Weld With Shielded Metal Arc Welding (SMAW) Process	H-2. Weld/Cut With Oxyacetylene	H-3. Weld Wit Gas Tungsten Welding (GTA (Heliarc)
I. BUILD/REPAIR/MODIFY MOLDS	I-1. Identify Types of Molds (e.g., three plate, multi-cavity, cam action, hot runner)	I-2. Identify Typical Mold Components (e.g., cavity and core insert, ejector mechanisms, etc.)	I-3. Estimate B Mold Cost Considerations (e.g., engineeri material, labor)
	I-5. Install Mold Temperature Control Devices	I-6. Disassemble/Assemble Molds	I-7. Identify "O the Shelf" Mol Components
	I-9. Build/Assemble/Adjust Ejector Plates and Pins	I-10. Vent Molds	I-11. Diagnose Repair all Mold Related Proble
J. USE COMPUTERS	J-1. Use Computer Operating Systems	J-2. Use Computer Inquiry Systems	J-3. Use Comp Aided Drafting (CAD) Softwar
	J-5. Use Mold Flow Software		

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Welder

Competencies Profile

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study arc/gas, SMAW, GMAW, GTAW, brazing, wldallurgy, and print interpretation to perform welding operations necessary to produce a workpiece to required standards

A. FOLLOW SAFE PRACTICES	A-1. Wear Personal Protective Equipment	A-2. Identify Safety Rules	A-3. Familiarize Oneself With Safety at Facility	
B. DEMONSTRATE TECHNICAL COMMUNICATION	B-1. Use Standard American Welding Society Standard Welding Terms and Definitions			
C. INTERPRET WELDING DRAWINGS	C-1. Review Print Notes, Dimensions and Symbols	C-2. Identify Basic Layouts of Drawings	C-3. Interpret Drawing Lines and Views	C-4. Interpret Welding Symbols
	C-5. Convert wldric to English	C-6. Understand Print Specifications	C-7. List Assembly Procedure Per Print	C-8. Understand Various Types of Welding Prints
	C-9. Visualize Final Weldment From Print	C-10. List Flaws and Errors on Drawings	C-11. Interpret AWS Standard Welding Symbols	
D. BASIC WELDING METALLURGY	D-1. Become Conversant With Common wldallurgical Terms	D-2. Describe the Properties of Various Types of Steel	D-3. List Various Alloys and Their Effect When Combined With Steel	D-4. Describe the Effect Welding Has on Properties of various Types of Carbon Steels
	D-5. Identify Basic Concepts Relating to the Heat Affected Zone			

E. BASIC SHIELDED METAL ARC WELDING (SMAW) AND OXY-FUEL GAS CUTTING	E-1. Define Selected Welding Terms Per AWS A3.0	E-2. Describe AWS Code for Mild Steel Electrodes	E-3. Set Up Welding Machine to Required Polarity	E-4. Use Correct Start and Stop Techniques for SMAW Electrodes
	E-5. Set Up Equipment for Shielded wldal Arc Welding	E-6. Strike an Arc, Run Continuous Stringer Bead	E-7. Weld Using Weave Technique	E-8. Weld Multi-Layer Buildup
	E-9. Set Up and Shut Down Oxy-Fuel Equipment<	E-10. Cut Steel Plate Using Oxy-Fuel Equipment	E-11. Produce Welds with Properly Fused Starts and Filled Craters	E-12. Low Hydrogen Starts and Stops
	E-13. Design Welded Joints	E-14. Weld V Groove With Backing in Flat Position	E-15. Set Up Air Carbon Arc Equipment for Gouging	E-16. Use Air Carbon Arc to Excavate a Partial Pen Groove Weld
	E-17. Gouge to Excavate Defect	E-18. Make X-Ray Quality Weld Repair on a 2F Position T Joint ½" Plate	E-19. Produce Fillet Weld on Sheet Steel T Joints	E-20. Produce Fillet Welds on T Joints Made Up of Both Thick and Thin Joint Members Using SMAW
	E-21. Use Correct Starts for Low Hydrogen Electrodes	E-22. Use Correct Stops for Low Hydrogen Electrodes	E-23. Weld Using Large Diawlder SMA Electrodes<	
F. ADVANCED SHIELDED METAL ARC WELDING (SMAW) AND CUTTING	F-1. Weld Single V Groove Welds With Open Roots From One Side	F-2. Weld Various Diawlders of Pipe to Plate	F-3. Produce SMAW Pipe - 5G Position	F-4. Produce SMAW - 2G Position Groove Welds
	F-5. Roll Weld Pipe - SMAW	F-6. Produce SMAW Pipe - 5G Position	F-7. Produce SMAW Pipe - 6G Position	F-8. Create SMAW Pipe to ASME Section 9
	F-9. Interpret Welding Procedures			

G. PIPE WELDING - SMAW	G-1. Produce End Preparations	G-2. Fit and Tack Weld Pipe	G-3. Roll Weld Open Root Pass on Pipe - 1G Position	G-4. Weld Open Root Pipe Joint - 2G Position
	G-5. Weld Open Root Pipe - 5G Position	G-6. Pass Guided Bond Tests Per ASME Section 9	G-7. Weld Open Root Pipe - 2G Position	G-8. Weld Pipe Open Root Passes All Positions Using GMAW
	G-9. Weld Pipe With Backing Using FCAW-G			
H. GAS METAL ARC WELDING (GMAW)	H-1. Assemble GMAW Gun and Name All Parts	H-2. Understand Gas wldal Arc Power Source	H-3. Shielding Gas Application	H-4. Weld With GMAW Using Spray Transfer
	H-5. Weld With GMAW Using Short Circuit Transfer	H-6. Weld With GMAW Using Globular Transfer	H-7. Weld With GMAW Using Pulsed Spray Transfer	H-8. Weld T Joints on Carbon Steel Using GMAW Equipment
	H-9. Weld Multi-Pass Fillet Welds - All Positions	H-10. Weld Multi-Pass Fillet Welds - 3F Vertical Position	H-11. Weld Multi-Pass Fillet Welds - 4F Overhead Position	H-12. Weld Single V Groove With GMAW
	H-13. Weld Pipe - 1G Position			
I. GAS TUNGSTEN ARC WELDING (GTAW)	I-1. Understand Technical Aspects of GTAW	I-2. Weld Fillet - 2F Horizontal Position	I-3. Weld Fillet - 3F Vertical Position	I-4. Weld Fillet - 4F Overhead Position
	I-5. Weld on 1/8" Material and 100% Penetration	I-6. Weld 2G Position Using GTAW	I-7. Weld 3G Position Using GTAW	I-8. Weld 4G Position Using GTAW
	I-9. Weld Pipe Open Root Passes All Positions Using GTAW			
J. MATHEMATICAL SKILLS	J-1. Determine Measurements and Angles			
K. MAINTAIN HOUSEKEEPING	K-1. Clean Work Area and Insure That No Safety Hazards Exist			
L. QUALITY INSPECTIONS	L-1. Perform Visual Checks			

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Industrial Maintenance

Competency Profile

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uses mechanical, pneumatic, hydraulic, and electrical skills to maintain, repair and/or install equipment/machinery used in industry.

A. PRACTICE SAFETY	A-1. Follow Safety Manuals and All Safety Regulations/Requirements	A-2. Use Protective Equipment	A-3. Follow Safe Operating Procedures for Hand and Machine Tools
B. APPLY MATHEMATICAL CONCEPTS	B-1. Perform Basic Arithmetic Functions	B-2. Convert Fractions/Decimals	B-3. Convert Metric/English Measurements
	B-5. Perform Basic Trigonometric Functions	B-6. Calculate Speeds and Feeds for Machining	
C. INTERPRET ENGINEERING DRAWINGS AND CONTROL DOCUMENTS	C-1. Review Blueprint Notes and Dimensions	C-2. Identify Basic Layout of Drawings	C-3. Identify Basic Types of Drawings
	C-5. Verify Drawing Elements	C-6. Practice Geometric Dimensioning and Tolerancing (GD&T) Methodology	C-7. Describe the Relationship of Engineering Drawings to Planning
	C-9. Analyze Bill of Materials (BOM)	C-10. Read/Interpret Prints from Different Occupations	
D. USE PRECISION MEASURING TOOLS	D-1. Identify Types of Measurement	D-2. Select Proper Measurement Tools	D-3. Apply Proper Measuring Techniques
	D-5. Perform Measurements With Hand Held Instruments	D-6. Perform Measurements on Surface Plate	D-7. Perform Inspections Using Stationary Equipment
E. USE HAND TOOLS	E-1. Use Proper Hand Tools	E-2. Install helicoils	E-3. Use drill motors
	E-5. Use torque wrenches	E-6. Use gasket cutters	E-7. Install safety wire

F. OPERATE MACHINE TOOLS	F-1. Prepare and Plan For Machining Operations	F-2. Operate Power Saws	F-3. Operate Drill Presses
	F-5. Operate Horizontal Milling Machines	F-6. Operate Metal Cutting Lathes	F-7. Operate Grinding/Abrasive Machines
	F-9. Operate metal shears	F-10. Operate brakes	F-11. Operate hydraulic/mechanical presses
G. PERFORM WELDING OPERATIONS	G-1. Weld With Shielded Metal Arc Welding (SMAW) Process	G-2. Weld/Cut With Oxyacetylene	G-3. Weld With Gas Tungsten Arc Welding (GTAW) (Heliarc)
H. TROUBLESHOOT EQUIPMENT AND SYSTEMS	H-1. Maintain air conditioning systems	H-2. Maintain electrical control circuits	H-4. Maintain pneumatic control systems
	H-5. Troubleshoot motors	H-6. Troubleshoot centrifugal pumps	H-7. Troubleshoot positive displacement pumps
	H-9. Troubleshoot blowers	H-10. Understand turbines (gas, steam)	H-11. Install piping
I. REPAIR INDUSTRIAL POWER PLANT SYSTEMS	I-1. Troubleshoot small gasoline engines	I-2. Troubleshoot medium size gasoline engines	I-3. Troubleshoot medium size natural gas powered engines
	I-5. Troubleshoot diesel and industrial power plants	I-6. Troubleshoot steam turbines	I-7. Troubleshoot gas turbines
J. REPAIR POWER TRANSMISSION SYSTEMS	J-1. Troubleshoot gear power transmission drives	J-2. Troubleshoot chain power transmission drives	J-3. Troubleshoot belt drive systems
K. FABRICATE/INSTALL SHEETMETAL PARTS	K-1. Layout sheetmetal parts	K-2. Form and/or bend sheetmetal parts	K-3. Fasten sheetmetal parts together
L. SELECT EQUIPMENT FOR MANUFACTURING APPLICATIONS	L-1. Evaluate/recommend condensing units	L-2. Evaluate/recommend furnaces	L-3. Evaluate/recommend chillers
	L-5. Evaluate/recommend pumps	L-6. Evaluate/recommend compressors	L-7. Evaluate/recommend hydraulic units

M. JOIN PIPES	M-1. Solder metal pipes	M-2. Braze or silver solder metal pipes	M-3. Weld metal pipe joints
	M-5. Swage metal pipe/tubing	M-6. Join metal pipe with threads	M-7. Join metal pipe with cement
	M-9. Join plastic pipes with glue	M-10. Join plastic pipes with hot air welding process	
N. CONSTRUCT AIR DISTRIBUTION SYSTEMS	N-1. Fabricate loop systems	N-2. Fabricate dead end systems	N-3. Fabricate branch systems
O. START-UP NEW AIR CONDITIONING SYSTEMS	O-1. Check for leaks	O-2. Check for safe operation	O-3. Evacuate and charge system
	O-5. Troubleshoot systems	O-6. Fill hydraulic systems and set flow through coils	O-7. Install thermostats and low voltage wiring
P. MAINTAIN BOILER AND STEAM SYSTEMS	P-1. Troubleshoot systems	P-2. Adjust systems for optimum performance	
Q. MAINTAIN HYDRAULIC/PNEUMATIC DEVICES	Q-1. Demonstrate working knowledge of hydraulic systems	Q-2. Repair/replace pumps	Q-3. Repair/replace valves
	Q-5. Clean/replace filters	Q-6. Replace seals	Q-7. Clean/fill reservoirs
	Q-9. Repair/replace motors	Q-10. Perform PM and service as needed	
R. PERFORM NON DESTRUCTIVE TESTING	R-1. Make industrial x-ray inspection	R-2. Test using ultrasonic process	R-3. Test using vibration analysis
S. USE COMPUTERS	S-1. Use Lotus 123 or Quattro Pro	S-2. Use WordPerfect	S-3. Work in a Windows environment
	S-5. Use maintenance programs	S-6. Program ladder logic for PLCs	
T. ALIGN SHAFTS	T-1. Use feeler gauges	T-2. Use single indicator	T-3. Use double indicator
	T-5. Use Laser		
U. INSTALL/ALIGN MACHINES	U-1. Install electrical connections	U-2. Perform required pipe fitting tasks	U-3. Grout as necessary
	U-5. Level and align machine components	U-6. Discuss finishing materials (ie. paints, sealers)	U-7. Use stud gun

V. DEMONSTRATE KNOWLEDGE OF BUILDING CONSTRUCTION	V-1. Discuss wood framing techniques	V-2. Discuss metal framing techniques	V-3. Discuss sheeting processes
	V-5. Discuss grouting materials	V-6. Discuss surveying applications and methods	
W. MAINTAIN ELECTRICAL DEVICES	W-1. Use Electrical Test Equipment	W-2. Apply Specific Terms to Electrical Circuits	W-3. Analyze Series, Parallel and Complex DC/AC Circuits
	W-5. Inspect Transformers and Generators	W-6. Discuss Sensors and Feedback Technology	W-7. Set up/Program PLC

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Sheet Metal/Composites

Competency Profile

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A. PRACTICE SAFETY	A-1. Follow Safety Manuals and All Safety Regulations & Requirements	A-2. Use Protective Equipment	A-3. Follow Safe Operating Procedures for Hand and Machine Tools	A-4. Maintain a Clean and Safe Work Environment
B. APPLY MATHEMATICAL CONCEPTS	B-1. Perform Basic Arithmetic Functions	B-2. Interconvert Fractions/Decimals	B-3. Interconvert Metric/English Measurements	B-4. Perform Basic Algebraic Operations
	B-5. Perform Basic Trigonometric Functions	B-6. Extract Roots and Raise Numbers to a Given Power	B-7. Determine Areas and Volumes of Various Geometric Shapes	B-8. Solve Ratio, Proportion, and Percentage Problems
C. INTERPRET BLUEPRINTS AND SHEET METAL DRAWINGS	C-1. Review Blueprint Notes and Dimensions	C-2. Identify Basic Layout of Drawings	C-3. Identify Basic Types of Drawings	C-4. List the Purpose of Each Type of Drawing
	C-5. Verify Drawing Elements	C-6. Practice Geometric Dimensioning and Tolerancing (GD&T) Methodology	C-7. Describe the Relationship of Engineering Drawings to Planning	C-8. Use Standards to Verify Requirements
	C-9. Analyze Bill of Materials (BOM)	C-10. Understand and Use Quality Systems	C-11. Draw Sketches of Repairs and Alterations	C-12. Use Blueprint Information
D. IDENTIFY MATERIALS AND PROCESSES	D-1. Identify and Select Appropriate Non-Destructive Testing Methods	D-2. Perform Chemical Etching	D-3. Understand Basic Heat-Treating Processes	D-4. Inspect and Check Welds
	D-5. Perform Precision Measurements			
E. PERFORM CLEANING AND CORROSION CONTROL	E-1. Identify and Select Cleaning Materials	E-2. Perform Cleaning and Corrosion Control		

F. WORK WITH SHEET METAL STRUCTURES	F-1. Install Special Rivets and Fasteners	F-2. Inspect Bonded Structures	F-3. Inspect and Repair Plastics, Honeycomb, and Laminated Structures	F-4. Inspect and Repair Sheet Metal Structures
	F-5. Remove and Install Conventional Rivets	F-6. Hand Form, Layout and Bend Sheet Metal		
G. WORK WITH COMPOSITE STRUCTURES	G-1. Identify Method of Repair	G-2. Identify Bill of Materials (BOM)	G-3. Repair Per Technical Order/Engineering Specifications or Disposition	G-4. Perform Resin Transfer Molding
	G-5. Lay Up a Fiberglass Mold	G-6. Build Honeycomb Structure to Specifications		

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Tool and Die

Competencies ProfileReturn to Table of Contents

skilled workers who produce tools, dies, and special guiding and holding devices that are used in machines and produce a variety of products

A. PRACTICE SAFETY	A-1. Follow Safety Manuals and All Safety Regulations & Requirements	A-2. Maintain Safe Equipment and Machinery	A-3. Maintain a Clean and Safe Work Environment	A-4. Use Safe Operating Procedures For Hand and Machine Tools
	A-5. Use Safe Machining Practices	A-6. Use Safe Lifting Practices	A-7. Consult and Apply MSDS for Hazards of Various Materials	
B. APPLY MATHEMATICAL CONCEPTS	B-1. Perform Basic Arithmetic Functions	B-2. Perform Basic Algebraic Operations	B-3. Perform Basic Trigonometric Functions	B-4. Use Basic Geometric Principles
	B-5. Use and Apply Cartesian Coordinate System			
C. DEMONSTRATE QUALITY CONTROL AND MANAGEMENT	C-1. Utilize Appropriate Inspection Techniques	C-2. Perform Appropriate Use and Calibration of Inspection Equipment	C-3. Know Qualitative Parameters of Machinery and Equipment	C-4. Maintain Equipment to Produce Quality Parts
	C-5. Know and Use Quality Systems	C-6. Write Inspection Procedures	C-7. Document Inspection Results	
D. DEMONSTRATE KNOWLEDGE OF MANUFACTURING MATERIALS	D-1. Identify Materials With Desired Properties	D-2. Demonstrate Knowledge of Physical Properties of Materials	D-3. Identify Manufacturing Properties of Materials	D-4. Discuss Classification System for Metals

E. DEMONSTRATE KNOWLEDGE OF MANUFACTURING PROCESSES	E-1. Know Operation of Vertical and Horizontal Mills and Tooling	E-2. Know Operation of Engine and Turret Lathes and Tooling	E-3. Know Operation of Drill Presses and Tooling	E-4. Know Operation of Surface and Cylindrical Grinders
	E-5. Know Operation of Heat Treating Equipment and Processes	E-6. Know Operation of Welding Equipment and Processes	E-7. Know Sheet Metal Operations	E-8. Know Operation of Jig-Boring Machines and Tooling
	E-9. Know Operation of Tool and Cutter Grinders	E-10. Know Operation of Metal Saws	E-11. Know Operation of Wire EDM	E-12. Estimate Time Required/Cost to Produce a Part
	E-13. Know Proper Flow of Parts Through Shop	E-14. Utilize Concepts and Principles of Fixturing	E-15. Make Calculations For and Use Sine Bar/Sine Plate	E-16. Make Calculations For and Use Rotary Table and Dividing Head
F. PERFORM CNC PROGRAMMING & CAM TASKS	F-1. Prepare and plan for CNC machining operations	F-2. Select and Use Tooling Systems for CNC Machines	F-3. Manually Program CNC Machines	F-4. Use Computer-Aided Manufacturing (CAM) System
G. DEMONSTRATE COMMUNICATION SKILLS	G-1. Use Written Correspondence	G-2. Use Written Technical Information	G-3. Communicate Technical Information Verbally	G-4. Use Graphics for Visual Aid
H. PERFORM DRAFTING/CAD TASKS	H-1. Demonstrate Traditional Mechanical Drafting Skills	H-2. Use Computer-Aided Drafting (CAD) System	H-3. Use and Apply Geometric Dimensioning and Tolerancing (GD&T) Methodology	
I. USE COMPUTERS	I-1. Use Computer Operating Systems	I-2. Use File Management Systems	I-3. Perform Backup on a Personal Computer	I-4. Install/Use Software Packages
	I-5. Understand and Apply Computer Terminology			

J. INTERPRET & USE BLUEPRINTS AND RELATED DOCUMENTS	J-1. Interpret, Review, and Apply Blueprint Notes, Dimensions, and Tolerances	J-2. Interpret and Understand Basic Layout/Types of Drawings	J-3. Understand and Analyze Bill-of-Materials	J-4. Ascertain Job Requirements From Drawings
K. PERFORM DIE OPERATIONS	K-1. Utilize Basic Die Theory and Principles of Die Design	K-2. Perform Die Repair	K-3. Demonstrate Die Making Skills	K-4. Demonstrate Understanding of Different Types of Industrial Dies

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Computer-Aided Drafting & Design

Competency Profile

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A. APPLY MATHEMATICAL CONCEPTS	A-1. Perform Basic Arithmetic Operations	A-2. Compute Unit Conversions	A-3. Perform Basic Trigonometric Operations	A-4. Use Cartesian Coordinate System
	A-5. Use Polar Coordinate System			
B. DEMONSTRATE FUNDAMENTAL DRAFTING SKILLS	B-1. Use Drawing Media and Related Drafting Materials	B-2. Use Measuring Scales	B-3. Identify Drafting Line Styles and Weights (e.g., center, hidden, object, dimension)	B-4. Prepare Title Blocks and Other Drafting Forms
	B-5. Create Technical Sketches			
C. PLAN AND ORGANIZE ACTIVITIES	C-1. Determine Scope of Drafting Assignment	C-2. Select Appropriate Drafting Techniques for Drawings	C-3. Maintain Supporting Documents	
D. PREPARE MECHANICAL PRODUCTION DRAWINGS	D-1. Understand and Apply Mechanical Drawing Methods	D-2. Create Detail Drawings	D-3. Create Assembly Drawings	D-4. Perform Technical Lettering
	D-5. Create Bill of Material/Parts List	D-6. Apply Dimensions and Notes	D-7. Apply Dimensional Limits and Tolerances	D-8. Apply Current Drafting Standards to Drawings
	D-9. Perform Drawing Revisions	D-10. Use Commercial and Vendor Data		

E. ASSIST ENGINEERING PERSONNEL	E-1. Understand Basic Design Procedures	E-2. Utilize Fasteners (e.g. screws, bolts, nuts, seals, springs, ...) for Mechanical Applications	E-3. Utilize Power Transmission Elements (e.g. gears, cams, belts, chains, couplings, linkages, for Mechanical Applications	E-4. Utilize Bearings for Mechanical Applications
	E-5. Understand Basic Manufacturing Methods	E-6. Utilize Brakes and Clutches for Mechanical Applications	E-7. Design Shafts for Use in Mechanical Applications	
F. USE COMPUTER-AIDED DRAFTING SYSTEM	F-1. Start and exit a software program	F-2. Demonstrate Proper File Management Techniques	F-3. Use Directory Structure	F-4. Edit Drawing File
	F-5. Utilize Drawing Set-Up Procedures	F-6. Use Geometric Objects (e.g. lines, splines, circles, ...)	F-7. Use Text for Drawing Annotation	F-8. Control Object Properties (color, line-type, ...)
	F-9. Use Viewing/Display Commands	F-10. Use Standard Parts and/or Symbol Libraries	F-11. Understand Procedure to Print/Plot a Drawing	F-12. Use Standard Layering Techniques
	F-13. Create Mechanical CAD Drawings	F-14. Create 3D Mechanical Models	F-15. Utilize CAD Drawing Data	F-16. Use Drawing Feature Attributes
	F-17. Obtain 3D Model Property Data	F-18. Use CAD Dimensioning Features	F-19. Use Third-Party Software for CAD Enhancement	F-20. Perform CAD Customization Procedures

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CAD/CAM and CNC Technician

Competencies Profile

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A. PRACTICE SAFETY	A-1 Use proper safety equipment	A-2 Identify proper clothing	A-3 State proper attitudes for safety	A-4 Handle chemicals properly
	A-5 Identify fire hazards in machining	A-6 Demonstrate proper personal hygiene	A-7 Demonstrate proper laboratory cleaning	
B. PERFORM MEASUREMENTS	B-1 Identify applications and limitations of measuring instruments	B-2 Demonstrate use of measuring instruments		
C. APPLY MATHEMATICAL CONCEPTS	C-1 Perform mathematical computations with calculator	C-2 Calculate fractions and decimals with calculator	C-3 Convert Metric and US standard units of measure	C-4 Perform RPM calculations
	C-5 Perform feed calculations	C-6 Perform depth of cut calculations	C-7 Perform thread cutting calculations	C-8 Perform tap drill calculations
	C-9 Interpret reference tables related to machining	C-10 Apply Cartesian coordinate system in machining	C-11 Perform trigonometric calculations	C-12 Perform Pythagorean Theorem calculations
	C-13 Perform polar trigonometry calculations			
D. READ BLUEPRINTS	D-1 Describe types of blueprint drawings	D-2 Describe blueprint dimensions	D-3 Interpret title, notes, revision and material information	D-4 Interpret blueprint drawings

E. PROGRAM CNC MACHINES & EDM	E-1 Demonstrate cutting tool identification and application	E-2 Identify and describe machine operation nomenclature	E-3 Identify and describe essentials of CNC systems	E-4 Identify and describe types of CNC hardware and software
	E-5 Identify and describe machine axes and coordinate systems	E-6 Describe and interpret CNC coding systems	E-7 Write NC programs	E-8 Plan process for NC operations
	E-9 Demonstrate use of electronic discharge machine (EDM)			
F. OPERATE CNC MACHINES & EDM	F-1 Describe vertical machining process and safety	F-2 Describe vertical machining functions	F-3 Set-up and program operation of vertical machine	F-4 Deomonstrate machining of objects on vertical machining center
	F-5 Deomonstrate machining of objects on vertical machining center	F-6 Describe CNC turning process, equipment and safety	F-7 Describe turning center	F-8 Set-up and program operation of turning center
	F-9 Demonstrate machining of objects on turning center			
G. USE COMPUTERS	G-1 Demonstrate use of computer hardware	G-2 Select/use computer operating systems	G-3 Demonstrate use of basic DOS commands	G-4 Demonstrate use of Windows and Windows NT commands
	G-5 Demonstrate use of MACROS in Windows and Windows NT programs	G-6 Demonstrate use of computer communication systems		
H. USE CNC VERIFICATION PROGRAMS	H-1 Identify CNC verification software programs	H-2 Program and create CNC verification using program icons	H-3 Program CNC verification using pull-down menus	

I. USE CAD/CAM PROGRAMS	I-1 Demonstrate understanding of CAD/CAM programs	I-2 Access CAD program options	I-3 Create designs with CAD section of CAD/CAM program	I-4 Demonstrate ability to use program functions
	I-5 Process tool path data			

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Instrumentation

Competency Profile

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will be able to troubleshoot, repair, calibrate, specify and commission as required all instrumentation and control components relating to overall plant operations. This is to include dynamic evaluation, testing, controller tuning, and total system performance evaluations.

A. PRACTICE SAFETY	A-1. Follow Safety Manuals and All Safety Regulations & Requirements	A-2. Use Protective Equipment	A-3. Follow Safe Operating Procedures for Hand and Power Tools	A-4. Maintain a Clean and Safe Work Environment
B. MAINTAIN CONTROL SYSTEMS	B-1. Proper storage of Circuit Boards	B-2. Collect and Record Data according to company requirements	B-3. Test and Calibrate Transducers according to Specs	B-4. Perform Preventive Maintenance Procedures for Control Devices
	B-5. Test and/or Replace Printed Circuit Boards	B-6. Function Check Individual Elements Within Loop	B-7. Troubleshoot Different Types of System Modules	B-8. Test Different Types of System Modules
	B-9. Configure Software	B-10. Repair Different Types of System Modules	B-11. Install Control System Hardware	B-12. Simulate Control System Check
	B-13. Loop-Check Control System	B-14. Perform On-Line Testing	B-15. Troubleshoot and Maintain PLC's and Motor Control Systems	

C. MAINTAIN FIELD INST. DEVICES	C-1. Test and Calibrate Pressure, Level, Flow, Temperature Switches	C-2. Troubleshoot and Repair Pressure, Level, Flow, Temperature Switches	C-3. Adjust Dampers and Positioners	C-4. Troubleshoot and Adjust Control Drive (Damper)
	C-5. Test and Calibrate Indicators and Gauges	C-6. Troubleshoot and Repair Indicators	C-7. Test and Calibrate Transmitters	C-8. Test and Calibrate Recorders
	C-9. Troubleshoot and Repair Recorders	C-10. Troubleshoot Linear Variable Differential Transformers	C-11. Troubleshoot, Repair, and Calibrate Transmitters	C-12. Test Different Field Sensing Elements
	C-13. Install/Replace Field Sensing Elements	C-14. Troubleshoot and Repair Transmitters	C-15. Tune Controllers: Pneumatic and Electronic	C-16. Troubleshoot and Repair Plant Computing Systems Relating to Process Controls
	C-17. Troubleshoot and Repair Solenoid Valves	C-18. Perform Preventive Maintenance Procedures for Field Devices	C-19. Test and Repair Thermocouples	C-20. Check and Test Vibration Sensing Elements
	C-21. Inspect and Troubleshoot Power Supplies and Converters	C-22. Test and Calibrate Control Valve Actuators	C-23. Troubleshoot and Repair Control Valves/Positioners	C-24. Test and Calibrate Controllers
	C-25. Troubleshoot and Repair Local Controllers	C-26. Troubleshoot and Repair Electronic Computing Relays	C-27. Troubleshoot and Repair Analyzers	C-28. Test and Calibrate Air Analyzers
	C-29. Test and Calibrate Water Analyzers	C-30. Troubleshoot Servo Valves	C-31. Calibrate Servo Valves	C-32. Test and Clean Video Display Unit
	C-33. Check and Adjust Video Display Unit	C-34. Specify and Configure Smart Field Devices, i.e., Transmitters and Valves	C-35. Operate Control Systems Including Single Element, Cascade, Ratio, and Feedforward	C-36. Test and Calibrate Gas Analyzers

D. ORGANIZE WORK ROUTINES	D-1. Organize Documents and Drawings Required on the Job	D-2. Determine Proper Tools, Equipment & Materials to Perform the Job	D-3. Coordinate Work Activities with Other Crafts/Units	D-4. Coordinate Preventive Maintenance Schedule with Planning Group
	D-5. Verify Equipment Isolation Prior to Performance of Work for Safety Reasons	D-6. Report Abnormal Equipment Problems to Supervisor	D-7. Write New Calibration Procedures if Needed	D-8. Follow Specifications
	D-9. Perform Basic Algebraic Operations	D-10. Perform Basic Trigonometric Functions	D-11. Perform Basic Calculus Operations	
E. COLLECT AND FILE DATA	E-1. Record Test/Calibration Data	E-2. Record Preventive Maintenance Data	E-3. Record Equipment Disconnect Data	E-4. Evaluate Collected Data
	E-5. Review & Revise Procedures if Needed	E-6. Write Reports Required by Company	E-7. Specify Equipment for Control Systems	E-8. Prepare and Update Specification Forms
	E-9. Write Work Orders	E-10. Prepare and Update Ladder And/Or Logic Diagrams	E-11. Program PLC's	
F. PARTICIPATE IN CONTINUING EDUCATION ACTIVITIES	F-1. Read/Interpret Diagrams and Drawings	F-2. Sketch Diagrams	F-3. Study Technical Equipment Information	F-4. Application of ISA/JIC Standards
	F-5. Understand Proper Use of Test Equipment and Tools	F-6. Learn to Write Technical Reports	F-7. Acquire Safe Practices for Handling Hydraulic and Special Tools	F-8. Utilize Technical Manuals
	F-9. Understand Personal Computers	F-10. Attend on-going Safety Training Courses	F-11. Participate in Plant Related Training	F-12. Attend PLC Training
	F-13. Attend DCS Training			
G. MAINTAIN AND CONTROL INVENTORY ACCORDING TO COMPANY POLICIES AND PROCEDURES	G-1. Learn to Review and Forecast Spare Parts Inventory	G-2. Prepare Parts Request	G-3. Verify Parts Received	G-4. Research/Verify Substitute Specifications

H. TRBLSHOOT, INSTALL, MAINTAIN AND OPERATE MOTOR CONTROL SYSTEMS	H-1. Troubleshoot, Install, Maintain, and Operate Motor Starters	H-2. Troubleshoot, Install, Maintain, and Operate Relays	H-3. Troubleshoot, Install, Maintain, and Operate Pushbuttons	H-4. Troubleshoot, Install, Maintain, and Operate Switches
	H-5. Troubleshoot, Install, Maintain, and Operate PLC Systems, i.e., PLC and DCS Networks			

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Laser Machinist

Competencies Profile

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will have a working knowledge of the principles of electronics, lasers, optics, materials, engineering documentation, CAD/CAM, systems integration all for the goal of producing products to acceptable engineering standards

A. APPLY MATHEMATICAL CONCEPTS	A-1. Perform Basic Math Functions	A-2. Perform Algebraic Functions	A-3. Study Exponents and Right Triangle Geometry	A-4. Study Elements of Plane and Solid Geometry
	A-5. Perform Data Evaluation and Statistical Analysis	A-6. Perform Proportioning and Interpolation	A-7. Perform Basic Trigonometric Functions	A-8. Investigate Vectors and Vector Systems
	A-9. Investigate the Cartesian Coordinate System			
B. INVESTIGATE FUNDAMENTALS OF INDUSTRIAL ELECTRONICS & CONTROL	B-1. Perform Voltage, Current, Resistance and Power Measurements	B-2. Investigate Fundamentals of Analog Active Devices	B-3. Investigate Fundamentals of Digital Logic Circuitry	B-4. Investigate Operational Amplifiers for Industrial Applications
	B-5. Investigate Linear IC's for Industrial Applications	B-6. Investigate Electric Motors	B-7. Study Industrial Control Systems	
C. APPLY CONCEPTS OF MODERN OPTICS	C-1. Study Geometric Optics	C-2. Study Physical Optics	C-3. Study Refraction at Spherical Surfaces	C-4. Perform Imaging with a Single Lens
	C-5. Perform Imagine with Multiple Thin Lenses	C-6. Study F-Stops and Apertures	C-7. Study Optical Systems	C-8. Study Interference
	C-9. Study Diffraction	C-10. Study Polarization	C-11. Investigate Radiometry and Photometry	

D. PERFORM CNC PROGRAMMING	D-1. Apply Machine Specific (Milling and Lasers) Nomenclature and Terminology	D-2. Investigate the Cartesian Coordinate System as Applied to Milling and Laser Machines	D-3. Apply CNC Programming Language	D-4. Perform Start Up, Tool Changing, and Ending of Programs
	D-5. Perform Positioning and Basic Drilling	D-6. Create a Sub-Program	D-7. Perform Contouring	D-8. Apply Tool Radius Compensation (Cutter Comp)
	D-9. Perform Programming Preparation	D-10. Apply Special Laser Coding Parameters		
E. INVESTIGATE INDUSTRIAL LASER SYSTEMS	E-1. Study Characteristics of Light	E-2. Understand Basic Laser Principles	E-3. Study Laser Output Characteristics	E-4. Investigate Output Modification
	E-5. Apply Safety and Laboratory Procedures	E-6. Perform a Laser Exposition	E-7. Perform Laser Alignment, Gauging, and Inspection	E-8. Investigate Holography and Applications: Non-Destructive Testing
	E-9. Investigate the Interaction of High Power Laser Beam with Materials	E-10. Perform Laser Welding and Surface Treatment	E-11. Perform Laser Material Removal	
F. PERFORM COMPUTER AIDED DRAFTING (CAD)	F-1. Understand PC Basics	F-2. Discuss CAD Basics and File Management	F-3. Use Drawing Settings	F-4. Perform Basic Editing Commands
	F-5. Create Drawings with Accuracy	F-6. Organize Drawing Information	F-7. Control the Display of Drawings	F-8. Use Intermediate Drawing Commands
	F-9. Perform Intermediate Editing Commands	F-10. Create Multiview Drawings	F-11. Create Sectioned Drawings	F-12. Investigate Basic Dimensioning
	F-13. Perform Advanced Dimensioning	F-14. Use and Manipulate Blocks	F-15. Use Blocks to Automate the Drawing Process	

G. PERFORM LASER MATERIALS PROCESSING	G-1. Discuss Traditional Mechanical Machining	G-2. Discuss Non-Traditional Methods of Machining	G-3. Understand Basics of Laser Heating	G-4. Investigate the Effects of Laser Irradiation on Materials including:
	G-5. Demonstrate Machine Operations including:	G-6. Study Hazards and Safety including:		
H. PERFORM COMPUTER AIDED MANUFACTURING (CAM)	H-1. Understand the Basics of a PC Based CAM System	H-2. Discuss Basic CAM Operations	H-3. Set Up Cutting Tools	H-4. Create Part Profiles
	H-5. Edit Part Profiles	H-6. Perform Advanced Editing of Part Profiles	H-7. Edit Tool Paths	H-8. Perform Drilling and Counterboring
	H-9. Use Construction Layers in SmartCAM®	H-10. Perform User Commands and Machine Events	H-11. Create Families of Parts	H-12. Perform CAD/CAM Integration
	H-13. Perform Code Generation			
I. PRACTICE LASER SAFETY	I-1. Discuss Laser Safety Basics	I-2. Discuss Laser Hazards including:	I-3. Study Laser Safety Standards and Hazard Classifications (i.e., ANSI Z136.1 Standards)	I-4. Investigate Controls for Surveying, Alignment and Leveling Lasers
	I-5. Discuss Eye Protection including:			
J. PERFORM MEASUREMENT AND INSPECTION	J-1. Study Basics of Metrology	J-2. Select Instruments Used for Measurement	J-3. Interpret Limits and Tolerances	J-4. Select Gaging Tools
	J-5. Use CMM for Location of Features	J-6. Perform Surface Metrology	J-7. Perform Measurement by Comparison	J-8. Perform Circularity, Cylindricity, Profile of a Line, and Runout Measurements
	J-9. Investigate Advanced Metrology Topics			

Last modified by

Brad Whittington

Automated Equipment Repair (CIM)

Competencies Profile

Return to Table of Contents

operates, programs, maintains, and repairs automated machine tools and automated manufacturing processes

A. APPLY SCIENCE TO SOLVE INDUSTRIAL PROBLEMS	A-1. Apply Scientific Notation and Engineering Notation to Solve Technical Problems	A-2. Apply Algebraic Formulas to Solve Technical Problems	A-3. Use Variables in Alg to Predict Behavior of In
	A-5. Use Physics, Algebra, and Trigonometry to Analyze Simple Vectored Forces	A-6. Use Mechanical Physics to Analyze Mechanical Industrial Systems	A-7. Measure, Calculate, Quantities in English and mks) Systems
	A-9. Use Math and Thermodynamics to Analyze Problems Found in Industrial Heat Treating Systems	A-10. Use Math, the Physics of Electromagnetism and Optics to Analyze Industrial Systems	A-11. Use Math, Physics, Measurements to Determi Quantities
	A-13. Use Proper Lab Procedures to Test Chemicals Used in Industrial Processes	A-14. Use Chemical Formulas to Predict and Analyze Reactions in Industrial Processes	A-15. Use Proper Labora Test the Properties of Ele Compounds
	A-17. Apply Properties of Water to Analyze Industrial Water Treatment Processes		
B. USE DRAWINGS TO ANALYZE AND REPAIR SYSTEMS	B-1. Use Symbols, Organization, and Engineering Values on Mechanical Drawings	B-2. Use Symbols, Organization, and Engineering Values on Electrical Drawings	B-3. Use Symbols, Organ Engineering Values on El Drawings
	B-5. Use Symbols, Organization and Engineering Values on Digital Drawings		

C. USE CALIBRATED MEASURING INSTRUMENTS TO TEST/CALIBRATE COMPONENTS	C-1. Apply Machine Tool Metrology and Measurement Instruments to Align Machine Tools	C-2. Apply Electrical Measurement Knowledge and Instruments to Test/Calibrate Electrical Circuits	C-3. Apply Electronic Me Knowledge and Instrume Test/Calibrate Electronic
	C-5. Apply Digital Electronic Measurement Knowledge and Instruments to Test/Calibrate Digital Electronic Circuits		
D. EXPLAIN TEST RESULTS TO TEAM LEADERS, ENGINEERS, CUSTOMERS, AND OTHER TECHNICIANS	D-1. Use Written English Language; Write Complete Proper Sentences	D-2. Use Written English Language to Effectively Communicate Results of Technical Tests and Instructions	D-3. Use a Word Process Information from Various Write Effective Reports
E. RESOLVE SYSTEM FAILURES WITH CRITICAL THINKING, TROUBLESHOOTING, THEORY AND METROLOGY	E-1. Identify Nature/Purpose of a System, Subsystem, Module, or Component in a Complex Manufacturing Machine/Process	E-2. Apply Theory to Predict Behavior of a Complex Manufacturing Machine or Process	E-3. Measure Complex M Machine/Process to Deter Meeting Theoretical Expe
	E-5. Apply Critical Thinking to Determine If System Is Malfunctioning or If Process must Be Reapplied	E-6. Validate the Process and Apply Corrective Action	E-7. If Corrective Action Result in Repair of Syste Process

F. USE TECHNIQUES TO ISOLATE MALFUNCTION OF ELECTRONIC SYSTEMS	F-1. Calculate, Predict, and Measure the Response of Quantities in DC Circuits	F-2. Calculate, Predict, and Measure the Response of Quantities in AC Circuits	F-3. Calculate, Predict, an Impedance and Phase An Circuits
	F-5. Properly Set-up, Calibrate, and Use Meters and Oscilloscopes	F-6. Use Components Such as Resistors, Inductors, and Capacitors; Construct Circuits and Test Components	F-7. Use Meters/Oscillosc Measure Phase Shift or A ResistivE-Capacitive/Resi AC Circuits
	F-9. Use Meters and Oscilloscopes to Test Magnetically Coupled Devices	F-10. Apply Principles of DC Electrical Motors to Identify Types of DC Motors	F-11. Apply Principles of Motors to Identify AC M
	F-13. Use Meters or Oscilloscopes to Test Bipolar Transistors and Power MOSFETs	F-14. Use Meters/Oscilloscopes to Test Power Control SemI-conductors and Their Triggering Devices	F-15. Use Meters/Oscillo Power Supply Circuits, In Rectifiers/Filtering Circuit Phase DC Power Supplies
	F-17. Use Schematics and Meters or Oscilloscopes to Differentiate Between Various Types of DC Motor Control Circuits and Replace and/or Troubleshoot and Repair These Motor Controls	F-18. Use Schematic Diagrams and Meters or Oscilloscopes to Identify Advanced Motor Controls That Contain Newer Types of Semiconductor Devices, to Troubleshoot and Repair These Motor Controls	F-19. Apply Semiconduct Amplifier Concepts to Tr Replace or Repair the Mo the Circuit
	F-21. Use Schematic Diagrams and Meters or Oscilloscopes to Test Sensors		

G. MEASURE/ISOLATE MALFUNCTIONS OF MECHANICAL /FLUID POWER SYSTEMS	G-1. Know the Purpose and Use of Major Systems That Comprise a Hydraulic/Pneumatic System to Troubleshoot Components or Systems	G-2. Apply Purpose and Use of Valves in a Hydraulic or Pneumatic System to Troubleshoot Components or Systems	G-3. Use Formulas and M Calculate Quantities in H Pneumatic Systems
	G-5. Test the Condition and Behavior of Fluids in a Fluid Power System	G-6. Use the Knowledge of Flow; Measure Flow in a Fluid Power System	G-7. Calculate, Measure, Troubleshoot Hydraulic a Accumulators
	G-9. Identify, Assemble, Measure, and Apply Knowledge of Operating Characteristics of Selected, Specialized Fluid Power Circuits	G-10. Identify, Assemble, Measure, and Apply Knowledge of Operating Characteristics of Electrically Operated, Specialized Fluid Power Circuits	G-11. Understand and Us Instruments and Troubles Methods for Fluid Power
	G-13. Use Laws of Simple Machines and Physics to Troubleshoot Gearing Systems		
H. APPLY COMPUTER SCIENCE TO COMPUTER CONTROLLED INDUSTRIAL EQUIPMENT	H-1. Convert Mathematical Quantities in Digital Numbering Systems	H-2. Perform Mathematical Operations in Digital Numbering Systems	H-3. Read Digital Symbol it to Control of Digitally Equipment
	H-5. Solve Digital Logic Circuits and Ladder Diagrams in Electrical and Programmable Logic Control Circuits	H-6. Express a Complex Logic Problem in Boolean and Convert it into Ladder Logic	H-7. Use Various Progra and Boolean Algebra to P Computer Controlled Ind Equipment

I. CORRECT MALFUNCTIONS IN PLC CONTROLLED INDUSTRIAL EQUIPMENT	I-1. Use a Data Entry Device to Set up and Configure a PLC/PIC to Control Digital and Analog Input/Output Points	I-2. Set Up/Configure PIC/PLC as Part of the Control System of CNC Machine/Robot to Control Digital and Analog I/O Points	I-3. Use Equipment Manu Manufacturer's Specificat Entry/Monitoring Devices and Test Digital and Anal on a PLC or PIC
J. RESOLVE MALFUNCTIONS FOUND IN COMPUTER SYSTEMS CONTROLLING MANUFACTURING PROCESSES	J-1. Operate Different Classes of Personal Computers	J-2. Maintain Hardware/Software of a Personal Computer	J-3. Configure and Troubl Communications Interfac
K. ASSEMBLE/DISASSEMBLE MECHANICAL, ELECTRICAL, ELECTRONIC, AND COMPUTER SYSTEMS	K-1. Safely Assemble or Disassemble Mechanical Systems Such as Gearing Systems, Shafts, Couplings, Pulleys, Belts	K-2. Adjust Mechanical Systems Such as Gearing Systems, Shafts, Couplings, Pulleys, and Belts	K-3. Safely Assemble or Subsystems or Componen Power Systems
	K-5. Safely Assemble or Disassemble Electrical Systems or Components	K-6. Adjust Electrical Systems or Components	K-7. Safely Assemble or Electronic Systems or Co
	K-9. Safely Assemble or Disassemble Digital Systems or Components Such as PLCs, CNCs or Computers		
L. USE TEAMWORK TO ACCOMPLISH JOB TASKS AND CONTRIBUTE TO SUCCESS OF THE COMPANY	L-1. Participate in Team Projects and Contribute to Success of the Team and the Project	L-2. Participate as a Member of Manufacturing Enterprise and Contribute to Success of the Company	L-3. Apply Cooperation a Management Techniques Members of the Team an Tasks

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Last modified by

Brad Whittington

Machine Tool Advanced Skills Curriculum Project Deliverables

- BOOK 1: Executive Summary
- BOOK 2: Remediation and General Education Courses
- BOOK 3: Machining (Core) Courses
- BOOK 4: Manufacturing Engineering Technology
- BOOK 5: Mold Making
- BOOK 6: Welding
- BOOK 7: Industrial Maintenance
- BOOK 8: Sheet Metal
- BOOK 9: Tool and Die
- BOOK 10: Computer-Aided Drafting and Design (CADD)
- BOOK 11: Computer-Aided Manufacturing (CAM) and Advanced CNC
- BOOK 12: Instrumentation
- BOOK 13: Laser Machining
- BOOK 14: Automated Equipment Repair Technician (CIM)
- BOOK 15: Administration Book

Last modified by
Wallace Pelton

Partner Occupational Speciality Assignments

Although each of the six partner college development centers possessed detailed expertise in each of the MAST 15 occupational specialities, a division of work was still very necessary to ensure completion of the project due to the enormity associated with industrial assessment and complete curriculum revision for each of the areas of investigation.

Each Collegiate Partner was responsible for development of a specialization component of the overall model. Information for the future direction of this specialization area was obtained from NIST Manufacturing Centers and/or national consortia, professional societies, and industrial support groups addressing national manufacturing needs. Each Collegiate Partner tested its specialization model utilizing local campus resources and local industry. Information gained from the local experience was utilized to make model corrections. After testing and modification, components were consolidated into a national model. These events occurred during the first year of the Program. During the second year of the Program, the national model was piloted at each of the Collegiate Partner institutions. Experience gained from the individual pilot programs was consolidated into the final national model.

The following Partner Occupational Speciality Assignments matrix breaks out the primary and secondary responsibilities by center and speciality. All partners had final review responsibility to ensure all unique regional aspects were taken into consideration in the complete model.

MAST Partner College
Occupational Speciality Matrix

Speciality	TSTC	Itawamba	Augusta	Moraine Valley	CACT	Springfield
Manufacturing Engineering Technology (MET)	1	2				
Machining (MAC)	1	2				
Electrical Discharge Machining (EDM)	1	2				
Superabrasives (SAG)	1	2				
Mold Making (MLD)	1	2				
Welding (WLD)	2			1		
Industrial Maintenance Mechanics (IMM)			1	2		
Sheet Metal (SML)	1				2	
Composites (COM)	1	2				
Tool and Die (TLD)	2	1				
Computer Aided Drafting (CAD)		2	2	1		
Computer Numeric Control /CAM (CNC)		2	2		1	2
Instrumentation (INT)			1		2	
LASER Machining (LSR)	2					1
Automated Equipment Technician/CIM (CIM)				2	1	
General Education	1					

1 = College with Primary Responsibility
2 = College(s) with Supporting Responsibility

Each partner college has the responsibility to review all documentation for each of the occupational specialties.

CRITIQUE

TO: **JOE PENICK, MAST PROJECT DIRECTOR**

FROM: **DR. JAMES HALES, FORMATIVE EVALUATOR**

SUBJECT: **MAST STEERING COMMITTEE MEETING**
APRIL 24-25, 1996

Formative Evaluation Summary:

- The following criteria were established for the evaluation of the MAST Program:
  - Qualitative measures of Industrial Assessment Phase for development of skill competencies
  - Quantitative and Qualitative measures evaluating course material during Curriculum Development Phase
  - Appropriate evaluation of student achievement during the Pilot Program
- A program such as MAST is a collaborative effort between the program administrators and the partners -- education and industry. It is a continuing and iterative process throughout the life of the program. The process has been central to the development and success of this program.
- The nature of the MAST program is non-quantitative and therefore lends itself to qualitative analysis. The notion of quality includes the following criteria:
  - Advances the state of understanding about a topic (making a contribution)
  - Develops a framework for further research on the topic
  - Exceeds the standard of a field of study
  - Influences a variety of publics who are the target group
  - Influences the profession
- This evaluator for the formative aspects of the MAST Program has been able to observe, participate, provide feedback, and analyze the multiple variables of this program over an extended period of time. The involvement provided the

opportunity to respond to organizational processes and clarify action items particular to the partners -- education and industry.

- The following matrix is provided to illustrate the success of the MAST project. In particular, the matrix is designed to cross match the major program criteria with the quality criteria.

QUALITY CRITERIA

PROGRAM CRITERIA	Advances Understanding	Develops Research	Exceeds Standards	Influences Publics	Influences Profession
Meets expectations:					
Educators	X	X	X	X	X
Industry	X	N/A	X	X	N/A
New Curriculum Ideas Developed	X	X	N/A	N/A	X
Potential Utilization:					
Public Schools	X	X	X	X	X
Higher Education	X	X	X	X	X
Industry	X	N/A	X	X	N/A
Successful Pilot Testing	X	X	X	X	X
Broad Dissemination	X	X	X	X	X
Has Follow-up Potential	N/A	X	N/A	X	X
Initial Objectives Match Actual Outcomes	X	X	X	X	X

- In summary, the MAST Program has met and exceeded its original goals.

- The Industrial Assessment Phase has involved industry partners from a broad geographic region of the country and has several thousand industries involved in the review process. A significant value-added of this program is the input and validation by so many industries covering all areas of the country. It is this evaluator's judgment that the outcomes of this program can be truly called the result of a national study.

- The course material has been through several iterations of design and development by the program partners. The course content and skill standards have been reviewed and validated by the program industry partners. Of particular significance is the cross referencing of Skill Standards with SCANS Competencies and Foundation Skills.

- The Pilot Program and Career Action Plan was one of the last objectives addressed in the program as it was dependent on knowledge gained from the skills standards development process. It was really unrealistic to expect to determine student achievement as a result of a program of such short duration. It is appropriate, however, to state that program assessment by students, teachers and counselors was very positive. This outcome clearly leads to strong consideration for future study in positive relationship to the qualitative criteria.

- The Program administrative staff are to be commended for their exemplary and creative effort in accomplishing the goals of the program on time and within budget.

- The Program educational partners have fulfilled all of their agreed upon commitments. They have contributed significantly to the process which has created a new standard for technical skills curricula.

- The industry partners have contributed time, human resources, knowledge, and experience which forms the basic content of the proposed curriculum and without which a national consensus would not exist.

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL # of pages ▸ 1

To Joe Penick	From Marie Baker
Dept./Agency TSTC	Phone # 202-205-9379
Fax # 817-867-3380	Fax #

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

MEMORANDUM FOR: JACKIE W

FROM: MARIE BU

SUBJECT: TEXAS STATE TECHNICAL COLLEGE
(TSTC) GRANT- PROJECT DELIVERABLES

DATE: MAY 17, 1996

Jackie, here is some information on a truly excellent grant in the Manufacturing Technologies program. The MAST project will end September 30, 1996. The deliverables consist of fifteen volumes, fourteen of which contain a forward, duty/task/ subtask outline, course listing/course descriptions, technical competency/course crosswalk, "SCANS"/ course crosswalk. individual course syllabi, industry competency profiles and pilot program narrative. The first volume is an executive summary - a portion of which I have included for your review.

The project has received an additional grant from National Science Foundation (NSF) to continue their work on text review and revision, update laboratory experiences, and development of capstone experiences. In addition, during the term of our grant, they received a grant to establish Internet connectivity and homepage development. The Internet capability has been established for several months now and last week, Joe Penick, the project director, informed me that they receive approximately 250 'hits' per day on their homepage. They have also received requests for information from 350 community colleges. With the enormous interest this project has generated and the requests received for copies of the deliverables, they are entertaining the idea of publishing the executive summary (volume 1) in hard copy and including in this a CD ROM disk containing the fourteen volumes of specialty area information.($26.00 per set vs. $95-102.00 for printing and shipping the full set)

The project director is also writing two proposals. One, a JTPA Summer Youth program grant which would coordinate academics (remediation if necessary) and machinist courses coupled with campus work assignments. The second is a Dept. of Labor One-Stop-Shop grant utilizing TSTC's industry competency profiles as a correlation between employer needs and job seekers - potential candidates can compare their skills with the skills required for a particular position and can also couple their skill deficiencies with particular courses developed at TSTC.

Mr. Penick and Wallace Pelton, site coordinator, will be here Tuesday, June 18, 1996, to review the deliverables. I would also like them to make a brief presentation to interested OVAE staff at this time. Mr. Penick is a dynamic and energetic director and under his direction, I feel that this project has become an exemplary model of what Department awardees can achieve. I am excited about their accomplishments and felt that as Community College Liaison you would have an interest in the Dept. of Education project as well as the related initiatives.

BEST COPY AVAILABLE

CRITIQUE

TO: **JOE PENICK, MAST PROJECT DIRECTOR**

FROM: **DR. JAMES HALES, FORMATIVE EVALUATOR**

SUBJECT: **MAST STEERING COMMITTEE MEETING**
NOVEMBER 16, 1995

Major Themes:

- Partner institutions are progressing on development of curriculum materials. January 31, 1996 is still a reasonable complete date.
- Some confusion still exists on the role of partners in the development of the Summer Career Program. TSTC should develop a proposed program to be presented at the next partners meeting in January. Consideration should be given to distributing the package to public school counselors and teachers with in-service training on how to use the materials presented by partners. This would be in place of actually teaching and courses during the summer. The grant needs to be reviewed to determine if this approach is appropriate.
- TSTC will develop a draft proposal for the Remote Site Training package and present it to the partners at the January meeting. San Diego will assist by providing a CD-ROM example.
- The partners support the format and development of the Internet materials.
- The Texas industry survey needs to be completed in a timely manner.

Futures File:

- Need SCANS definitions included in the curriculum guides.
- Develop a plan for partners to assist in industry survey follow-up.
- Develop a generic video for general distribution at completion of project.
- Partners should develop a final marketing/dissemination plan at the next meeting.

Overall Program Evaluation:

- The program is progressing well as a result of the organization brought to the project by Mr. Penick. Baring unforseen circumstances, the project should be completed on schedule with all deliverables.

CRITIQUE

TO: JOE PENICK, MAST PROJECT DIRECTOR

FROM: DR. JAMES HALES, FORMATIVE EVALUATOR

SUBJECT: MAST STEERING COMMITTEE MEETING
AUGUST 28-29, 1995

Major Themes:

- The Steering Committee visited with key personnel at Sandia and Livermore National Labs. A comprehensive tour of labs and project awareness illustrated new technology applications coming on line.
    - Much effort was demonstrated in the area of lasers.
    - Additional skill assessments are available from Sandia and Livermore personnel.
    - Personnel were very clear on the need for articulated programs with secondary schools.
- The MAST partners reviewed the current status of the Occupational Skill Standards and Competency Profiles.
    - There is clear evidence that the profiles are coming together.
    - There is a need to standardize the industry selection and validation process. A general consensus for the process was established. TSTC needs to finalize and disseminate to the partners.
    - The format for course outlines needs to be determined. There should be absolute consistency among the partners with regard to course syllabi.
    - A process for documenting secondary school involvement should be developed. All partners should report their interactions in a consistent format.

Futures File:

- The Steering Committee for MASTER should include on or more representatives from the National Laboratories.

- What kind of secondary school curriculum and at what level is a long-term critical success factor relevant for future study?

Overall Program Evaluation:

- The Annual Report is comprehensive and clearly details all of the work during Year 1. Care must be exercised during Year 2 to continue to relate activities to the program proposal for deliverables and measures.
- This is the time in the program when "detail" becomes important for the development of the final project documents.

CRITIQUE

TO: **DR. HUGH K. ROGERS, MAST PROJECT DIRECTOR**

FROM: **DR. JAMES HALES, FORMATIVE EVALUATOR**

SUBJECT: **MAST STEERING COMMITTEE MEETING**
JULY 14, 1995

Major Themes:

- Status report of Occupational Skill Standards and Competency Profiles:
  - Potential for dissemination/implementation block grant from State of Texas. Steering Committee represents a critical mass -- industry, school, college representation, to leverage a grant award. Consider submitting proposal in next 12 months.
  - Critical success factors have been identified.
  - Development Centers are providing assigned standards and competencies.
  - Format for material presentation is thorough, detailed and easily interpreted.
  - There have been two national dissemination opportunities in the last few months -- CIMHE in Tulsa and NCATC in Pennsylvania.
  - Recruitment video has been significantly improved and was praised by Steering Committee.
- Public School Involvement:
  - The need to recruit students received considerable positive discussion with both industry representatives and school personnel sharing ideas, i.e.,
    - *Perception of machinist as quality career*
    - *School counselors' lack of knowledge about manufacturing*
    - *Cultural issue with parents who only think college*
    - *Teachers use college as motivator*
    - *Schools seek job shadowing and internship experiences for students*
    - *Need more parent involvement*

Futures File:

- Develop competency profiles for high school graduates articulating into manufacturing technology programs.
- Develop seamless articulation model -- high school, to certificate, to associate degree, to bachelor degree.
- Strengthen the student recruitment process for manufacturing technologies.
- Industry analysis of business paradigms which inhibit student internship opportunities -- separate myths from realities.

Evaluation:

- The Steering Committee was very participatory in the session. Feedback was positive and optimistic about the future of the program and outcomes implementation. The development centers continue to make progress on their assignments and the work-in-process by the host team is outstanding.

Overall Program Evaluation:

- The MAST Project is on schedule with regard to the "evaluation plan."
- The MAST Steering Committee has identified the critical success factors which will enable program completers to be successful entry-level employees. Skills competency development is on track in preparation for global validation.
- The curriculum phase is well under way with an excellent format developed which references competencies and SCANS skills with course syllabi.
- The Steering Committee has developed excellent rapport with public school program participants. School leadership has committed to active involvement in the program. Discussion has resulted in the identification of significant follow-up programs as a result of MAST.

CRITIQUE

TO: DR. HUGH K. ROGERS, MAST PROJECT DIRECTOR

FROM: DR. JAMES HALES, FORMATIVE EVALUATOR

SUBJECT: MAST COMMITTEE MEETING
MAY 21-22, 1995

Major Themes:

- Review of first draft of MAST curriculum document
  - High praise on part of program participants for format and layout of curricula.
  - All program participants in attendance agreed to use curricula format.
- Development Center updates
  - Texas State Tech and San Diego are most advanced in curriculum development.
  - Springfield and Moraine are prepared to submit first drafts of technical skills assessments and curriculum skills
  - Augusta and Itawamba are making progress toward industry analysis and subsequent curriculum skills.

Futures File:

- Remind participants of project time line and request copies of data collection, analysis and curriculum skills.
- Initiate monthly conference calls to involve all six participants and to assure progress.

CRITIQUE

TO: DR. HUGH ROGERS, MAST PROJECT DIRECTOR

FROM: DR. JAMES HALES, FORMATIVE EVALUATOR

SUBJECT: MAST MEETING AT OAK RIDGE CENTER FOR MANUFACTURING TECHNOLOGY
FEBRUARY 17, 1995

Major Themes:

- Overview of Center for Manufacturing Technology
  - Tour: SkillsTraining Program
    - Concurrent Engineering Center
    - Machine Tool Center
    - Metrology Center
  - Evaluation: Evidence of excellent prior planning to maximize time
    - Oak Ridge personnel well prepared
    - Excellent opportunity for questions
    - Everyone could hear group presenters
    - Good networking between Center and MAST participants
- MAST Program Review and Planning
  - Mast Development Center Updates
    - All six centers are making progress toward project objectives.
    - Clarification of data collection process and format for recording data was essential to this meeting.
    - San Diego, Springfield, and Moraine have developed curriculum in advance of industry data. CAUTION must be exercised to see that industry visits are to collect baseline data rather than validate new courses.
    - The schedule for completion of the project Phase I by late summer may be overly ambitious given the current level of work by the development centers.

Futures File:

- Review preliminary data gathering outcomes from each development center to assure consistency.

- Provide generic list of questions to guide discussion during industry visits
- Initiate monthly conference calls for progress check.
- Establish time and location for next meeting now to assure full attendance and participation.

CRITIQUE

TO: **DR. HUGH ROGERS, MAST PROJECT DIRECTOR**

FROM: **DR. JAMES HALES, FORMATIVE EVALUATOR**

SUBJECT: **MAST STEERING COMMITTEE MEETING**
JANUARY 20, 1995

Major Themes:

- Human issues - quality, ethics, safety, teamwork, loyalty
- Project management skills
- Broad understanding of manufacturing plus technical skills
- Communication skills
- Schools - cooperative learning, distance learning
- Parent involvement
- Ability to change for changing careers
- Technical programs/careers not well known to teachers and students

Positive Aspects:

- Good representation of college/industry/educational partners
- Good participation by industry/education representatives
- Meeting kept on schedule
- Good luncheon
- Tour of facilities highlighted MAST program areas at college

Areas for Improvement:

- Presenters did not seem to understand their assignment
- Educators did not get status of presenting from up front

- Participants did not leave meeting with assignment or good knowledge of next step

Futures File:

- Technological literacy program for public schools
- Integrate human issues into technical curriculum

For more information:

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